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ABSTRACT

This annual compilation examines issues in the shaping and adaptation of the modern university, in five articles. The first article, by Amy Sue Bix, is titled "'Backing into Sponsored Research': Physics and Engineering at Princeton University, 1945-1970." It reviews the process by which Princeton University (New Jersey) made a series of decisions which gradually involved it heavily in government-supported research having little to do with its educational mission. The second article is "American Universities and the Inclusion of Professional Schools" (by Hugh Hawkins) which addresses issues in the increasing mixing of academic and professional education and reviews this mixing throughout U.S. history. The third paper, by James Turner and Paul Bernard, is "The 'German Model' and the Graduate School: The University of Michigan and the Origin Myth of the American University." It reviews one example of university adaptation as the University of Michigan attempted to reconcile advanced learning with the institution's primary work of collegiate or undergraduate education and resulted in the grafting of the graduate school onto the college. The fourth article, "The Chinese Scholars and the Modern University: The Appropriation of Foreign Educational Models, 1900-1930" (Xiaoqing Diana Chen), reviews the tension between traditional Chinese intelligentsia and the adaptation of Chinese universities to Western knowledge. A final article by Patricia L. Gregg reviews Nathan Glazer's "Schools of the Minor Professions" in the context of the evolution of schools of education, business, and journalism. (Individual articles contain reference notes.) (DB)

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HISTORY OF
HIGHER EDUCATION
ANNUAL

1993

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On the cover: Post-war undergraduate science instruction at Penn State. A coed in a 1952 physical chemistry class uses a potentiometer to measure resistance or induction. *Courtesy of* The Pennsylvania State University Archives.

HISTORY OF HIGHER EDUCATION ANNUAL 1993
THE MODERN UNIVERSITY: STUDIES IN ADAPTATION

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INTRODUCTION TO VOLUME THIRTEEN
THE MODERN UNIVERSITY: STUDIES IN ADAPTATION

ROGER L. GEIGER

This volume of the *History of Higher Education Annual* offers fresh contributions to understanding the shaping of the "Modern University." No single definition of this phenomenon is adequate because the university has largely defined itself through progressive iterations in diverse settings. The examples of university adaptation presented here, in fact, help to account for its protean nature. The two articles by X. D. Chen and James Turner and Paul Bernard provide important examples of this process—the transference of universities to new locales and their transformation in those settings.

The nineteenth-century German university was the first expression of the Modern University by virtue of its preeminence in the roles of furthering knowledge, training new scholars and scientists, and educating much of the professional class. In particular, Germany set the pace for the advancement of organized bodies of knowledge—or *Wissenschaft*. Other countries found themselves in a position of having to emulate German accomplishments or risk falling further behind. For the intellectually provincial United States, the gulf to cross was large; but for China, with a civilization based on an altogether different heritage, it was huge. But, what made German universities so formidable? To contemporaries, this was a perplexing problem. For us, it provides an intriguing case of cultural borrowing.

These two articles make abundantly evident that imitation was conditioned far more by the situation of the borrowers than by the nature of the model. Advanced education in both the United States and China, curiously, was mired in traditional forms of knowledge—Greek and Latin antiquity here and Confucian learning in China. The United States, however, had an extensive system of colleges (some called universities), and a few of them became the agents for incorporating the German style of learning. The best-known example of this is the founding of Johns Hopkins University (which has been admirably recounted by another contributor, Hugh Hawkins). But this audacious experiment was anything but typical. The process described by Turner and Bernard at the University of Michigan was in fact more representative. There the paramount challenge became reconciling advanced learning with the institution's primary work of collegiate or undergraduate education. The ensuing evolution was far from linear, and the insights into this process are often found in the nuances (and in the footnotes) of their account. In general, though, the predominant interests prevailed. Innovations that would have compromised the existing pattern of undergraduate education withered, and the American graduate school was eventually grafted onto the college. Ironically, this broad base became its greatest source of strength.

In China, by way of contrast, the chief agents in the borrowing of institutional models were the progressively weakening state and the Chinese Scholars—initially Confucian-trained civil servants, and later academics. The first attempt to harness Western knowledge produced, at least on paper, a centralized, hierarchical educational system modeled after Japan, but originally inspired by France. When the scholars gained power at the expense of the government, however, they implemented a system that would exalt their own expertise. In an almost grotesque case of cultural borrowing, China mimicked some of the most restrictive features of German universities—the elevation of idealistic philosophy and the subordination of practical fields. Although this phase was soon displaced by the ascendancy of American influence and American models, Chen argues that the central relationships did not change. Western knowledge and western-style universities were used by the intelligentsia for the pursuit of their own ends. Chinese universities consequently remained an exotic species with shallow roots, and were unable to convey the real fruits of Western learning to the Chinese state or its people.

Adaptations to critical bodies of knowledge underlie the remaining three contributions. Those by Hugh Hawkins and Patricia Gregg provide complementary interpretations of the university's role in professional education—its inclusion in the university and the special problems of mediating between the outside professions and the Academy. Professional learning, no less than German learning, presented a challenge to American collegiate education, and it was resolved in a similar manner. University leaders, particularly Charles W. Eliot and Daniel Coit Gilman, believed strongly in the superiority of teaching professional knowledge in a university context, but also wished to avoid any possible infringement on the college. They successfully established the first professional schools (in medicine) that required a bachelor's degree for admission. This pattern would be replicated by other professional schools, but not without a struggle. With university leaders placing such high value on collegiate education in shaping professionals—what Hawkins calls "contextuality"—the mix of academic and professional education would long be at issue. This latent conflict between academic and professional knowledge lies beneath the internal tensions that Patricia Gregg probed for the schools of the minor professions.

The minor professions are by no means minor for American universities, but their treatment as historical subjects has been neglected and fragmentary. Gregg's point of departure is a seminal article by sociologist Nathan Glazer, which analyzed conflict within these schools, particularly in faculty roles, resulting from the juxtaposition of disciplinary knowledge with that drawn from professional praxis. Applied to the literature on the histories of schools of education, business, and journalism, Glazer's lens brings some common patterns into focus. All three fields turned to social science for what Hawkins calls a "base of systematic knowledge, grounded in theory"—but with somewhat different results. Education has suffered from the most pronounced status differentials between academic and practice-based knowledge. Journalism's utilization of academic disciplines seems in some areas to have come at the expense of its own credibility. But Business has most successfully erected a separate tradition of scholarship. Gregg's essay suggests that the interface between academic and practical knowledge may be the key to analyzing the history of professional schools, but the tensions present there in no way contradict Hawkins' view that their inclusion in universities ultimately enlarges "possibilities for the advancement of learning."

Amy Sue Bix's depiction of the accommodation of postwar research at Princeton perhaps demonstrates most strikingly the force of new knowledge in shaping universities. Among American research universities, Princeton undoubtedly most cherished and guarded its collegiate ambiance; yet its receptivity to defense research carried it down the path of constructing a massive off-campus research operation having little connection with its educational mission. While many American universities traveled a similar route, this case provides a particularly vivid exemplar. Bix's close study has reduced institutional evolution to a human scale, showing how progressive rationalizations by scientists and administrators caused Princeton to accept practices like classified research that were initially unthinkable. This account makes clear that the Pentagon was not twisting arms. Rather, the shared commitment to the advancement of knowledge—by the university as well as by engineers and physicists on its faculty—made it virtually impossible for them to resist the opportunities presented by defense research. In retrospect, they felt they had "backed into" something they had not foreseen, but all along they were pursuing, under new and extraordinary circumstances, a fundamental purpose of the modern university.

“Backing into Sponsored Research”: Physics and Engineering at Princeton University

AMY SUE BIX[1]

In the three decades following World War II, government funding for research projects in science and engineering completely transformed Princeton University. In 1940, the university's leaders generally directed their efforts toward delivering a humanities-centered undergraduate education. By 1965, Princeton's undergraduates had to compete for attention with an expanded graduate school, new emphasis on science and engineering, large-scale sponsored research work, and industrial consulting. The university budget had been drastically reshaped; in 1939–1940, the entire institution received less than $30,000 in outside support for scientific research, but by 1969-1970, the aeronautical engineering department alone attracted $3 million in sponsored research.[2] The university had even been physically altered, expanding from one campus to two. In 1959, the alumni magazine found the extent of recent change worthy of special note, commenting:

> Princeton likes to think of itself as the home of the humanities and of great undergraduate teaching, yet from ... its budget it might appear an institute of science with a faculty primarily engaged in research .... Dean West used to regard Graduate students in science and engineering as beneath his notice; now they constitute more than half of the Graduate School .... this golden flood of government money contains ... the possibility of turning Princeton into some ... New Jersey analogue to M.I.T.[3]

The sense of institutional upheaval was undeniable. While the Cold War political and military context set the national stage for the university's transformation, the particular pattern of development at Princeton was conditioned primarily by factors internal to the institution. The history of Princeton's physics and aeronautical engineering departments, those that received the greatest share of this "golden flood of government money," illustrates how the particular leadership and style of institutional decision making shaped the university's course. Historians of science and technology have recently started exploring the development of sponsored research in American universities during the Cold War. Roger Geiger has argued that the military was "the only institution in our society with the vested interest and the resources to support and sustain an extensive research enterprise in American universities" in the immediate postwar period. Geiger concentrates on patronage in what he terms "critical departments," those areas already or potentially pursuing scientific or engineering work in what the military deemed "critical technologies."[4] A number of scholars have worked on the history of sponsored research at MIT and at Stanford, including Stuart Leslie, Rebecca Lowen, Peter Galison, and Bruce Hevly. In the early twentieth century, Karl Compton and others had guided MIT to the forefront of American engineering research and education, which positioned it to dominate university–government relations in the years after World War II. As for Stanford, Leslie has described how provost Frederick Terman seized the opportunity to convert it "from a respected regional institution into one of the world's preeminent centers for ... science and engineering."[5] Lowen has emphasized that Stanford was "an active participant in its [own] transformation;" in the 1930s, administrators and faculty had established a working relationship with the Sperry Gyroscope Company, but failed to resolve questions of which party should control various aspects of research and development.[6] After World War II, Stanford's physicists turned to the federal government for increased research funds, hoping that relationship would prove more manageable.[7]

Unlike that of MIT and Stanford, the postwar history of sponsored research at Princeton has received relatively little attention. It offers a fascinating contrast in the evolution American universities, highlighting the importance of institutional patterns of leadership and decision making.[8] During the 1950s, similar issues arose at all three institutions; scientists worked to develop a postwar research agenda, while university leaders grappled with persistent questions about government restrictions on research and the proper role of outside funding in a private university. Princeton's faculty and administrators approached such questions quite differently from those at Stanford and MIT. Stanford's connections to Sperry had already taught the university about both the opportunities and the obstacles associated with sponsored research, while MIT had the advantage of years of leadership in American engineering. Princeton, however, entered the postwar era without significant experience dealing with outside parties in arranging sponsorship for scientific and engineering research.

Over many decades, Princeton had established a solid reputation for excellence in undergraduate education, especially in the humanities. Yet prewar Princeton had also gained international distinction in mathematics, physics and astrophysics, making the physical sciences an increasingly prominent part of the university community. This latter strength offered Princeton the opportunity to capitalize on the postwar climate of support for scientific research, yet faculty and administrators remained concerned lest change destroy valued university traditions and undermine the quality of the humanities departments. Throughout Princeton's history, a conservative institutional style had kept the university relatively small and narrowly focused; unlike many other universities, Princeton had never built schools of law, medicine, business, or other professional programs. Entering the world of high-powered sponsored research would entail radical changes for postwar Princeton, and yet Princeton's traditionalism obscured just how rapidly the university was changing.

SPONSORED RESEARCH AT PRINCETON AFTER WORLD WAR II

Throughout the 1950s and the 1960s, the physics and aeronautical engineering departments accounted for most of the new money for large research projects flowing to Princeton. The Korean crisis and increased appropriations for military and nuclear programs caused the explosion of federally sponsored research at a national level. For Princeton, it was the university's record of scientific and engineering work during and immediately after World War II that served as the basis for Korean-era growth.

Since its creation in 1942, Princeton's Department of Aeronautical Engineering was guided by wartime imperatives. Its first professor, Alexander Nikolsky, helped design the first practical American helicopter at United Aircraft's Sikorsky Division and used his Princeton laboratories to perform helicopter research for the Army Air Force.[9] The war created shortages of equipment and trained engineers, forcing Princeton's aeronautics program to postpone any significant expansion until peacetime. However, this delay allowed the postwar department to add faculty and redesign the curriculum to reflect new technological realities, including supersonic speed and jet propulsion. In 1946, Princeton established its first graduate-level aeronautical engineering program, featuring courses in designing helicopters and high-performance airplanes, as well as "modern techniques of flight testing and structural research."[10] Princeton's ability to attract new faculty members who had acknowledged expertise and wartime experience gained respect for the aeronautical engineering department. During the 1950s, the U.S. Air Force and Navy sent at least ten engineering officers to Princeton each year for postgraduate training with Courtland Perkins, a flight test specialist.[11]

Princeton established its credentials as one of the nation's most promising sites for aeronautics research in 1946, when the Navy Bureau of Aeronautics and the Office of Research and Inventions asked the university to serve as the "technical and administrative headquarters" for "Project Squid." This multi-university program of basic and applied research, worth a half-million dollars per year, aimed at the production of "new and improved designs of aircraft, airfoils, jet propulsion devices and guided missiles." Princeton's aeronautical engineers concentrated on rockets, ram jets, and pulse jets, while chemistry department members worked on combustion research.[12] Another milestone came in 1948, when the Guggenheim Foundation selected Princeton and Cal Tech as the sites for two new centers to investigate "peace-time commercial and scientific uses of rockets and jet propulsion." The Guggenheim program provided Princeton with an annual grant of approximately $250,000 to finance research, graduate fellowships, and the construction of two new supersonic wind tunnels.[13]

As for Princeton's physics department, essentially the entire faculty had participated in wartime military research. Key members had joined Manhattan Project work at Los

Alamos.[14] After the war, industry and other universities attempted to lure away Princeton's top physicists, offering high salaries and extensive research facilities. The department concluded:

> The university must choose between going ahead vigorously, capitalizing the fine record of this department during the war or letting its physicists drift away to such a degree that it may take a generation to restore the department. The first courses will require money for men and for equipment, a great deal of money, but it offers a magnificant opportunity, completely in the tradition of the university ... [of] fundamental physical research.[15]

A serious equipment problem arose in 1950, when a mysterious fire destroyed the cyclotron that had been the center of Princeton's physics research since before the war. Although money from the Office of Naval Research (ONR), the Atomic Energy Commission (AEC), and insurance allowed Princeton to install an improved model within a year,[16] valuable research time had been lost. The shock of having normal operations disrupted led Princeton's physicists to reappraise the department's future. Concluding that "the time will come in a few years when our present cyclotron will not by itself fill the needs of an active research group,"[17] the physicists decided to seek approval for construction of a linear accelerator at Princeton. The high priority given this project obstructed the department's educational mission, as some faculty members cut back on undergraduate teaching in order to concentrate on writing proposals.[18] In 1956, after prolonged deliberation and negotiation over indirect costs, the AEC endorsed the Princeton accelerator.

Both Project Squid and the accelerator plans illustrated the origins of large sponsored research at Princeton in the late 1940s. Sponsored research, defined as projects financed directly by the government or other groups outside the university, was almost entirely a postwar development for Princeton. By 1949, the university received $1.2 million for science and engineering research, mostly from the federal government. Over half the faculty and one-third of the graduate students in science and engineering were involved with sponsored research.[19] Physics led in funds received, supporting work on shock waves, fluid dynamics and cosmic rays, followed by Aeronautical Engineering with studies of aerodynamics, jet propulsion, combustion, wind tunnel testing, and helicopter design.

To cope with the postwar growth of sponsored research, the university had to arrange new policies and additional administrative procedures. In 1946, President Harold Dodds created the Committee on Project Research and Inventions, charged with "establishing the proper balance between Princeton's educational responsibilities as a liberal arts university and the extent to which it can enter into research partnerships with government and industry." Dodds stressed that fundamental research should return as the central thrust of Princeton's science and engineering programs. As secretary of the new Committee, Dodds enlisted Raymond Woodrow, a former administrator at MIT's Radiation Laboratory and under Vannevar Bush at the Office of Scientific Research and Development (OSRD). Hugh Taylor, dean of Princeton's graduate school and head of the chemistry department, became the new committee's first chairman,[20] and observed: "research in ... science and engineering ... [in] these post-war years ... has grown to the point where its financing each year requires well over a million dollars. The problems involved have grown both in magnitude and complexity to such a degree that they could no longer be administered single-handed, as in the war years ...."[21]

Princeton's postwar policies required that sponsored research "be integrated with the other educational functions of the University" and remain open for unrestricted publication. Woodrow wrote, "projects which cannot be so integrated, but must be set aside in separate cubicles of their own with special procedures and special personnel, projects which are tied only lightly to academic departments or are primarily of service only to the outside sponsor and contribute little to educational objectives, have no place at Princeton during normal times."[22] Physics department chairman Henry Smyth agreed that universities should avoid classified projects, writing, "If our efforts [at research] make a direct contribution to the material or military welfare of this country, so much the better; but if that were the principal object we should be working in industrial or government laboratories .... [S]ecret work is incompatible with our philosophy. Consequently we have accepted government support only for research so basic in character that its results can be freely published."[23] Of course, Princeton's research during World War II had required secrecy, but that was regarded in retrospect as a rare exception to traditional academic openness. The university expected that in peacetime, its scientists and engineers would abandon applied and classified work and return to their traditional place in the old-style liberal arts university. Speaking to the Graduate Council in 1945, economics professor and incoming dean of faculty Douglas Brown declared that "Princeton comes out of the war with renewed enthusiasm for fundamental research ...."[24]

In fact, Project Squid and the accelerator demonstrated that far from breaking off all sponsored research, Princeton's scientists and engineers were preparing to extend and expand their connections with the federal government and other outside parties. By 1950, the physics department was complaining that "[t]he enormous increase in administration brought about ... [by sponsored research contracts] has made it impossible for the chairman of the department to remain a physicist."[25] The rhetoric of Princeton's faculty and administrators paid homage to the ideal of basic research, but government agencies stressed the practical contributions Princeton's work could make to national security. For example, the Navy funded physicist Rudolf Ladenburg's 1946 studies of the flow of supersonic air streams because of their applicability to the design of gun attachments to suppress muzzle flash.[26]

During the postwar period, many of Princeton's faculty and administrators recognized potential problems associated with sponsored research. At a 1946 conference held at Princeton on "The Future of Nuclear Science," internationally renowned scientists, professors, and business leaders debated the implications of outside funding. Columbia physicist I. I. Rabi declared "that university research is parasitic on teaching and that commercial research is parasitic on commerce and industry," phrasing that elicited "[v]iolent objections" from the audience.[27] Participants ultimately agreed there was no immediate threat that government funding would restrict academic work, but worried that in upcoming years, if universities became "too much used to and too dependent on governmental funds, [they] would eventually lose the strength to resist future restriction." Awareness of the high cost of large-scale modern research projects led conference members to conclude that universities should be able to accept government funds so long as no unreasonable restrictions impinged on academic freedom; Rabi commented, "We should not endanger the existence of the little oasis that is free and not under the direct necessity of continually justifying itself."[28] Cal Tech's president L. A. duBridge observed that during World War II, the military emergency meant that physicists working in government laboratories had been "willing to give up the most cherished privileges normally associated with scientific work—independence and freedom," but stressed that peacetime operations ought to be entirely different.[29] Conference attendees generally opposed having secret military research performed on campus, since it seemed "contrary to the spirit and purpose of a university." They also worried that security restrictions would tend to expand, discouraging scientists from entering those fields thus limited. In the end, the conference resolved "that freedom in science must protect itself from misguided attempts to control science from the outside. Those who make these attempts, inspired by the achievements of applied science in war time, must be made to recognize the different nature of pure research and its dependence on complete independence."[30]

Woodrow, Smyth, and other Princeton leaders expressed additional concerns about sponsored research, including the fear that universities might "neglect certain significant fields of liberal science, like geology, ... [that are] not ... currently fashionable in the Pentagon."[31] Woodrow worried that a "sort of negative control is thus exerted, inevitably discouraging inquiries into virgin fields which might in the future blossom, just as the initially impractical theory of relativity ... blossomed into atomic energy."[32] Woodrow also objected that one-year research contracts made long-range university budgeting difficult and created the danger that programs could be destroyed by a sudden withdrawal of government support. To guard against that possibility, Princeton's aeronautical engineering department in 1950 built its new supersonic wind tunnel out of war surplus material "to hold down the costs so that it could be used ... even if outside support ... should ever be withdrawn." At the wind tunnel's dedication, Dodds commended the idea of recycling military supplies, saying, "a valuable research weapon has been forged from an especially warlike set of materials. The compressors and red flasks outside this room were originally designed for ... naval torpedoes .... The sides of the tunnel were intended for armor plating on the USS Illinois. That material designed for wartime use can be converted to high scientific purpose should encourage us in our hope that scientific purpose can also serve the cause of peace ...."[33]

Woodrow and other Princeton officials were especially concerned that increased sponsored research would harm undergraduate education. In 1948, the Harbison Committee, a special panel appointed to analyze the situation, found that "many responsible and intelligent students" felt unhappy with the quality of their courses. Ever since Woodrow Wilson's days as president of Princeton, the preceptorial had been considered the heart of undergraduate teaching, reflecting an educational ideal of intense small-group discussions guided by top professors. The changing nature and priorities of university life seemed to endanger this tradition. Undergraduates resented the fact that precepts, classes, and laboratory sections had become too large for everyone to participate. Twenty-three percent rated their precepts as either "poor" or "embarrassingly bad," while 70 percent of seniors felt that Princeton was not "doing its best to keep the precept system in good working order."

Students had become aware that "outstanding teaching ability is not rewarded by advancement as published research is," and they perceived many professors as "busy, preoccupied with research, uninterested in undergraduate teaching, and sometimes unduly curt with students during their infrequent office hours." In short, the Harbison Committee reported, Princeton students believed that "the University has lost much ground on the teaching front since before the War, and yet refuses publicly to admit as much."[34]

The Harbison Committee did not discover great enthusiasm on the part of professors for a renewed commitment to teaching, reporting:

> Princeton already devotes more time to teaching and advising undergraduates than any comparable institution, and ... the faculty cannot devote still more time to them, in or outside of class, without giving up all pretensions to being ... productive scholars ... The younger men being appointed to the faculty today are ... more impressed by the paramount importance of publication in their future careers than were those ... of the 1920s ... [A]ny official move at the present moment to encourage more contact between students and faculty would be received by ... faculty in a different spirit from that of a generation ago.[35]

The Harbison report concluded, "recent growth and change in the university community ... makes it hard to realize the traditional ideal of close and friendly relations between undergraduates and members of the teaching staff." Faced with the faculty's reluctance to abandon the new emphasis on research, the committee recommended that students should learn to appreciate the way scholarly research could enhance teaching.[36] In practice, such a philosophy was not always realistic; most ordinary undergraduate courses could not readily incorporate sponsored research, especially projects surrounded by military secrecy. By 1948, both students and faculty had recognized that the minutiae of sponsored research arrangements was distracting Princeton departments and administration from their traditional concentration on undergraduate education, yet offered no real suggestions for addressing the students' discontent.

Fears that sponsored research would harm undergraduate instruction, academic openness and scientific progress itself led Princeton faculty to downplay the extent of their government work through the late 1940s. Nevertheless, scientists and engineers constantly reminded others of the importance of lucrative research contracts, since Princeton's endowment could not cover the rising costs of equipment needed for cutting-edge projects. The aeronautical engineers declared in 1949 that given the expense of research, "[w]ithout government or corresponding support, no privately endowed institution such as Princeton could more than wade in the analytical, theoretical fringes of it .... [We have] therefore, embraced such research sponsorship with a considerable enthusiasm."[37] For Woodrow, accepting outside funds was necessary simply to meet "the inflated costs of practically everything in the post-war years"; he noted that while professors and their students had constructed their own research equipment in earlier decades, such economy measures were not realistic for postwar science.[38]

Administrators and faculty also noted that outside support for science and engineering would enable the university to dedicate a greater share of its endowment to the humanities. The aeronautical engineers pointed out that although their 1949-1950 budget for research, teaching, and administration, over $300,000, was among the highest in the university, sponsored research funds and the Guggenheim money allowed the department to make "one of the smallest net departmental drains on Princeton's General Funds (some $8,000)."[39]

THE KOREAN CRISIS AND CREATION OF THE FORRESTAL RESEARCH CENTER

While Princeton's faculty and administrators were clearly concerned in the late 1940s over the possible implications of sponsored research, the threat of war in 1950 altered their perspective.[40] By September 1950, the Air Force, Navy, and the ONR were pressuring Princeton faculty to begin new research and speed up existing projects deemed vital to military advantage. Aeronautical engineering chairman Sayre declared:

> With the ... national emergency developing due to the Korean situation there has been a tremendous stimulation of the Aeronautical Engineering profession .... [T]o meet this challenge ... the department is studying how it can focus its work

> more on applied research ... to be of some immediate use to the Nation. This new situation may mean a complete change in ... the type and direction of the research to be done, ... a heavy increase in the number of men involved in the research programs and even the classification thereof.[41]

Princetonians frequently invoked Woodrow Wilson's 1896 phrase "Princeton in the Nation's Service" to imply that the university had a patriotic duty to undertake vital military research in wartime. The services' requests for Princeton to accelerate and expand research programs caused university officials to re-consider established policies on sponsored research. Just the previous year, Woodrow had declared that secret and applied research had no place at Princeton "during normal times"—but with the Korean involvement, suddenly times no longer seemed "normal." In September 1950, physics department chairman Allan Shenstone told a colleague, "We are already in Princeton discussing ... what ... we should do now and how our actions within the next year or so will affect the university in case war does break out, and it becomes necessary to change and expand our efforts. Decisions in this matter are yet to be made."[42]

That same month, Princeton's aeronautical engineers also began planning for war. Sayre executed a thorough review of his department and concluded that immediate changes seemed imperative. He told Dodds, "Every aspect of the training and research programs of the Department of Aeronautical Engineering is intrinsically related to the National Defense."[43] The ONR had already increased Princeton's existing contracts for helicopter research, hoping to put the work "on a long term continuing basis," and had also asked the department "to consider a brand new program of considerable magnitude for the study of high-lift devices," using Princeton's flight test experience and advanced wind tunnel equipment. The Air Force and Navy wanted Princeton to undertake "an accelerated program of theoretical and experimental studies in supersonic aerodynamics" and also to speed up Project Squid jet propulsion work. Finally, the Air Force had requested Princeton's aeronautical engineers, chemists and chemical engineers to organize a new "central laboratory for Chemical Kinetics," for research on rocket and ram jet combustion.[44] In all, Sayre said, it was "conceivable ... we might be asked to undertake research projects which would steadily expand to ... in excess of a million dollars a year."[45]

After reviewing the ways Princeton's aeronautical engineering could "make a significant contribution to the restoration of American airpower," Sayre insisted to Dodds that the department would require more office and laboratory space before expanding or accelerating any military research. Since 1946, Aeronautical Engineering had been crammed into buildings built for temporary wartime use and now "approaching marginal conditions of health and safety." Some staff had been assigned to small structures one-third of a mile away, and Sayre claimed the separation had impaired department operations.

Yet it would be awkward to expand any experiments on jet propulsion, shock waves, and explosions on the main campus, since other departments, especially the astronomical observatory, objected to the resulting noise, dust, and tremors. The same difficulty had existed in previous years; in 1943, the School of Engineering and the Department of Astronomy negotiated ways to reduce problems of "interference" between their different research operations. The engineering school finally offered to place its wind tunnels, engine testing equipment, and other large facilities as far away as possible from the observatory. The engineers had also agreed that after wartime research ended, they would seek the "express permission of the Department of Astronomy" before performing any nighttime work involving bright lights that would interfere with telescopes.[46] In 1950, as the Korean crisis gave engineering experimentation a new importance on campus, the prospect of expanded aeronautical activities still threatened to wreak havoc on quiet classrooms and libraries, and on the scientific research of other departments.

To avoid such problems and provide the desired space for expansion, Sayre wanted a new building to hold the entire aeronautical engineering program. In addition to a $300,000 building fund, Sayre also sought a sizable budget increase to help his department meet urgent war-related needs for increased library services, scholarships, and administrative support, and for "retaining our faculty and maintaining its high morale." Finally, the aeronautical engineers appealed for a greater share of endowment money, saying that "after nearly a decade of year-to-year financing, ... [the department] should be placed upon an adequately endowed footing." Sayre stressed that professors were being tempted to leave Princeton for more remunerative positions with industry, government, and more generous educational institutions. All told, Sayre requested a "Departmental War Chest" of $300,000 for a new main building and $100,000 to renovate the old laboratories, plus a "Departmental Endowment" of $1.2 million for four professorial chairs, $200,000 in fellowships, and $200,000 in research funds.[47]

Two months after submitting this $2 million solicitation, Sayre devised an even grander scheme. His initial plan had called for a new aeronautical engineering building on the regular campus, but by November, a new prospect for expansion had materialized. The Rockefeller Institute for Medical Research was moving to New York, vacating an 800-acre property three miles away from Princeton's main campus. Sayre suggested that the site would be "ideal" for a new Princeton aeronautical research center to house the aeronautical engineering department, Project Squid, the Guggenheim Jet Propulsion Center, and a new Chemical Kinetics Laboratory. Sayre told Dodds, "I could not exaggerate ... my sureness that the acquisition of the Rockefeller Institute property would absolutely guarantee world leadership for Princeton ... in the aeronautical sciences. Nor could I exaggerate the potential importance of ... such a center ... to our national defense and to the development of ... transportation and industry."[48] Sayre even projected that his department could build an airstrip for the three airplanes and helicopters it used in research and instruction, adding that a private airstrip would also help "our ROTC and [be] a convenience to air-minded alumni," not to mention visiting military officers and industrial representatives.[49]

Sayre's letter to Dodds underscored his excitement over the possibility of gaining access to vast sources of outside money. His tone suggested that while the immediate justification was to provide research for national defense, the real thrill was the chance to build his department into an "ideal" shape, free from any fiscal constraints. He told Dodds he was "sure that generous governmental assistance can be gained for the required conversion of present laboratory buildings ... [and] that any sort of new equipment or installations we wanted could be ... procured." In fact, Sayre declared, he was even "confident that overhead rates higher than those now established for on-campus projects could be specially negotiated," explaining:

> Our prospects for governmental support are already more than excellent. Possession of the Rockefeller property as something Princeton could 'contribute' should permit us to work out at the very highest level any sort of long range ... programs of research we might wish to undertake .... In fact, so long as the national emergency continues, any such aeronautical center of such quality is certain of an almost unlimited research and overhead budget.[50]

Sayre had already started dreaming about the endowment money that could be raised for such a major aeronautical research center, enticing donors with the promise of naming new buildings, laboratories, and even the airstrip in their honor. Sayre was also optimistic about future corporate financing, arguing that the new property would enhance the visibility of Princeton's aeronautics program so "that its prospects for support are greatly increased. The prestige of taking over from so famous an outfit as the Rockefeller Institute is alone a tremendous asset." The unique nature of Princeton's research center would mean that corporate donors would not be "vulnerable to appeals from all other engineering schools. The share Princeton would be 'contributing' is so much greater. The opportunity to render quid pro quo service is greatly increased ..." In all, Sayre "confidently" estimated that the new center could raise at least a $1.5 million endowment, as well as drawing government funds of at least $500,000 per year and annual corporate funding over $100,000.[51] Whereas in September, Sayre had asked Dodds for a greater share of the university's endowment, by November he was promising that the Rockefeller property would enable aeronautical engineering to develop its own vast endowment and win outside financing for expanded research.

In another confidential memorandum to Dodds, Sayre elaborated on the idea that government money could serve as a dependable means for enhancing the status of Princeton engineering with essentially no risk to the university itself. He declared:

> We can be absolutely certain that we can win the fullest government interest in our proposed program. The question will be how far that interest can be financially exploited. We certainly can count on all needed direct support of research activities and ... increased overhead.[52]

Sayre believed that Princeton could depend on virtually permanent government support, reasoning that since air power would always be essential to national security, there was little danger of major federal cutbacks in aeronautical research. To be safe, however, Sayre cautioned that Princeton should not build research facilities "so large that they are impossible to operate at all without heavy subsidy ... a number of other universities ... have acquired such 'sacred cow' equipment, very much to their ultimate disadvantage." He suggested that Princeton would be foolish not to seize its share of the money available for expanded engineering research, telling Dodds:

> We should take advantage during the coming years of full government support and ... prosperity in industry to build our supporting endowment ... [and] cultivate the ... support of a wide list of corporations ... [to] build up a reserve fund for the laboratories adequate to cover all basic costs throughout a very substantial period of decreased activity.[53]

Despite Sayre's confidence about future support for military research, Princeton's administration thought it wise to assess the full financial outlook before making a commitment to purchase the Rockefeller land. Throughout late 1950, Woodrow and other administrators discussed the proposed Princeton Aeronautical Research Center with the chairman of the Defense Department's Research and Development Board, the Air Force's director of research and development, the Chief of Naval Research and top ONR officials. Woodrow reported to Dodds that these government representatives had offered their "general endorsement" of the plan and "assurances" that the new facility's purchase price could be amortized over fifteen years. Furthermore, Woodrow agreed with Sayre that "a substantial part of post-emergency costs" for the new research center could probably be met with corporate support, since Allied Chemical, Atlantic Refining, and other manufacturing companies had already demonstrated an "unmistakable interest" in Princeton's research.[54] To formalize ties with such firms, Woodrow advocated creating a Corporate Associates program, charging companies a yearly fee for the right to attend special conferences and gain access to university research. He stipulated that faculty members should not undertake any "product" development work for the corporate associates. Princeton officials noted that a similar program at Cal Tech had quickly attracted $115,000 in corporate pledges, while comparable arrangements at MIT and the University of Chicago also appeared financially successful.

Dodds later commented that while university leaders had initially experienced "serious doubts whether such an expansion should be undertaken ... [the] growing national emergency hastened the decision."[55] In January 1951, Princeton announced its $1.5 million purchase of the Rockefeller property, renamed after Princetonian James Forrestal, former secretary of defense and a staunch supporter of military research programs. Dodds reassured faculty, staff, students, and alumni that government and private contracts would finance development and operation of the new center, permitting the "release [of] general funds for other university purposes."[56] As a final inducement to discourage opposition, Dodds even suggested that part of the new property could be developed as attractive lakeside residences for university staff. The president insisted that a "core program in the liberal arts" would continue to represent "the essence of the Princeton program" and reminded his audience that moving engineering research to the new site would leave more room on the main campus for the expansion of other departments and university activities. Finally, Dodds pointed out that some businesses and the state of New Jersey had also expressed interest in acquiring the land, and the Army had reportedly considered using the site for biological experimentation. But according to Dodds, the Rockefeller Institute's trustees had sold the land to Princeton for a lower price than they could have gotten from industry or government because they "took into consideration the perpetuation of the property for scientific use under the University's aegis."[57] Dodds emphasized that the land purchase served as a way to "protect ... the University community against imminent encroachment by industrial developments which threaten us ...." The Forrestal Center would bring corporate money into Princeton, while simultaneously preventing large-scale industrial operations from marring the aesthetics of the suburban campus. Princeton's administration and alumni had always been proud of the university's peaceful, landscaped setting; by moving shock wave and jet propulsion work off campus, Dodds promised that the pristine main quadrangles would remain essentially unsullied by new construction, noise, or explosions.

While the main campus would not be physically altered, Princeton's purchase of the Rockefeller property did significantly change the shape of the university in a larger sense. As a *New York Herald Tribune* writer observed:

> The addition of the center's 800 acres to the 1,200 comprising the present campus provides the greatest expansion at Princeton since ... 1754 .... It will put a new eighty-acre airport for flight control and supersonic tests on an expanded campus occupied also by ivy-covered buildings more than a century and a half

> old .... In both undergraduate and faculty circles the large land acquisition ... is being called 'the second Louisiana Purchase.'[58]

In his new position as director of the Forrestal Center, Sayre contended that national security remained the immediate justification for expansion, saying, "The government wanted a lot more and wanted it faster." He declared that the new aeronautical engineering facilities would save Princeton two years in "getting an emergency ... program under way *[sic]*,"[59] adding that the military crisis meant that "[t]he world's most important research no longer can be Ivory Tower investigation ...."[60] Yet at the same time, Sayre insisted that the new Forrestal Center would concentrate on pure rather than applied knowledge, shunning any interest "in the hardware end of engineering." Referring to the department's rocket studies, he said, "After two years of very basic research, we are now investigating actual performance .... in six months ... if the thing continues to show promise it ought to [be] farmed out to some company. It's foolish to ask our long-haired boys to sit down and develop the actual engineering side."[61]

In the months following the center's creation, Sayre's optimism about government support seemed to have been justified. Princeton arranged with the military to write off the property's purchase price and renovation costs over fifteen years, while research contracts included full overhead coverage of salaries and wages. After all, Woodrow reminded Navy officials, "The acquisition of these facilities ... was predicated on the premise that they would be used almost exclusively for Government research projects."[62]

Such progress in government support did not mean that Princeton had abandoned interest in attracting corporate backing. The university's new Office for Corporation Service quickly made arrangements for companies to enroll as five-year members of the Corporate Associates program in exchange for a minimum of $25,000. Benefits included regular reports on Forrestal research, access to Forrestal's library service, and invitations to special technical conferences to "discuss problems of mutual interest with ... the staff."[63] By the end of 1951, Princeton had sent out letters advertising its new program to at least 150 corporations, hoping to induce about 40 to join. The appeal noted that while "[a]t the present time, the Forrestal Center is concentrating upon the development of new basic science and new engineering principles important to industry engaged in the national defense effort," Princeton officials expected that at some indefinite future date Forrestal would be "able to shift its objectives [away] from specific defense needs" and toward "the welfare of American commerce and industry."[64] The aeronautical engineering faculty's interest in developing better helicopter flight tests, raising flight and landing efficiency, improving stabilization and servo-control mechanisms, and solving the problem of irregular firing or "chugging" in rocket motors were a few of the commercial possibilities held out to the aeronautics industry.[65] But in December 1951, United Aircraft executive Frederick Rentschler reported to Princeton vice president George Brakeley that at a meeting of the Aerospace Industries Association (AIA), he had found that "important individuals in the industry ... were not too much impressed" with the pitch for Forrestal, because they faced a "great number of pleas for contributions which were continually pouring in." Aerospace executives were unsure whether Princeton was expecting the aviation industry to carry "the bulk of the load" of supporting Forrestal, or "just how broad the base will be" among other types of companies.[66] Brakeley acknowledged that many aircraft companies were "already contributing to MIT and Cal Tech and that other universities, notably Columbia, N.Y.U., Cornell, Stanford and Chicago, are also in the field for support of science and engineering," but reported that Sayre, ever "the enthusiast about the Forrestal Center," remained "optimistic... that with continued effort," Princeton could attract business support. Brakeley added that appeals for the center had also been targeted at the petroleum, chemical, and metallurgical industries.[67] By April 1952, twenty companies had signed up, including IBM, RCA, General Motors, Firestone, B.F. Goodrich, Dow Chemical, Philips Chemical, Shell Oil, Standard Oil, United Aircraft, McDonnell, Grumman, and Fairchild Engine.[68] Even before dedication, the Forrestal Center had raised one-quarter of the expected $2 million endowment and building fund.

However, the speed with which the new facility had been created resulted in continuing difficulties. In 1952, Forrestal's directors approached the Alfred P. Sloan Foundation for a sizable contribution to the center's capital funds and operating budget. After visiting the center, Alfred P. Sloan, Jr., sent a letter to Laurance Rockefeller, who had arranged the special tour, with harsh criticism of Princeton's efforts. To his mind, Sloan commented, Forrestal simply did not represent a well-organized, thorough approach to scientific and engineering research. He described the center as "form with little substance," adding:

> [T]he University has grouped together certain selected activities in the scientific area and has tagged them with the name of the Center [but a]pparently there are other activities essential to a completely rounded-out scientific program not included in the Center proper. This distribution appears to be based upon convenience more than upon operational integrity .... the Center as such has no ... really separate identity. It is only an arbitrary portion of the University as a whole.[69]

Sloan believed that Princeton was overly ambitious, attempting to "embrac[e] the whole area of scientific investigation except for the medical sciences." He suggested that it was pointless for Princeton to try to catch up with MIT and other "already constituted and highly developed technological institutions." Even attempting to do so, Sloan estimated, would require a $3 million operating fund for just the first ten years of work, and he did not wish to commit his foundation to such a substantial project.[70]

Sayre was deeply disappointed with Sloan's reaction, since he had believed that the new Forrestal Center would easily impress national foundations and win their support. Hoping to persuade Sloan to reverse his decision, Sayre prepared a careful rebuttal of the criticism, telling Rockefeller:

> One point of great importance to establish with Mr. Sloan is the difference in objective between the effort in science and engineering at Princeton which is entirely limited to ... basic science and the operation at MIT which includes ... engineering development .... The cost of such basic science research is characteristically only a small fraction of that of applied research .... Princeton is already much further toward great strength in basic science than could have been apparent on such a quick visit as Sloan could make to us.[71]

In other words, Sayre maintained, Princeton's research potential should not be judged against standards set by MIT, but should be understood as reflecting Princeton's long experience and expertise in basic science. However, to help satisfy Sloan's objections, Sayre suggested that Princeton could always "set finite limits upon the Center's scope" or "organize the Center into clearcut laboratories, each one covering a *finite* area of basic science." Sayre himself favored the second option, because of its fund-raising advantages; each separate laboratory could be pitched to a different sponsor. For example, Sayre suggested, Sloan might be tempted to fund "The Sloan Laboratories for the Aeronautical Sciences" or "The Sloan Laboratories for Advanced Nuclear Science."[72] But despite such inducements and despite Sayre's defense of Forrestal's value, Princeton failed to win large-scale funding from the Sloan Foundation.

The Sloan memorandum and Sayre's response clearly indicated that by mid-1952, Princeton had not yet produced a clear public definition of the Forrestal Center's purpose. As Sayre himself noted, the university had not yet decided whether Forrestal should be run "as an over-all operation or as a center for the establishment of separate permanent laboratories."[73] The initial haste to purchase the Rockefeller property and start major defense projects had obscured such issues. Princeton's leaders had not defined how Forrestal would be connected to overall University operations, leaving observers such as Sloan with lingering doubts about the project's goals and viability.

Perhaps shaken by Sloan's comments about "form with little substance," Sayre and other Princeton officials belatedly worked to clarify Forrestal's agenda and administration. By the end of July, Woodrow described Forrestal as a program in "the high-performance fundamental sciences—in other words, those areas of research where high speed, high temperature, high energy, high stresses, are involved."[74] It was important to present a clear image of Forrestal's operations both to rationalize internal university organization and to appeal to outside observers. But Princeton's faculty and administration never completely clarified a definition of Forrestal's purpose or agreed about its relationship to the rest of the university, matters that would continue to trouble Princeton.

Although Princeton's leaders insisted that Forrestal was an integral part of the university, the three-mile physical separation of the two areas posed significant problems. After aeronautical engineering's operations moved out to Forrestal, department members no longer felt connected to the main campus. Professors began to spend most of their time out at Forrestal, and the department's rapport with undergraduates was soon lost, a serious matter on a campus that had traditionally stressed undergraduate teaching. Courtland Perkins, the new aeronautical engineering chairman, wrote in 1952:

> [T]he difficulties incurred by this move [to Forrestal] with regard to student relationships will be with us for some time .... [Being] some three miles further away from the main campus is perfectly satisfactory for graduate students, for they are supplied with offices in the area and all courses are taught at the Center. However, the situation is very serious for the undergraduate students ... [because] they miss the close faculty touch afforded their colleagues in the other departments.[75]

Aeronautical engineering professors tried to reestablish personal contact with undergraduates by holding regular office hours on the main campus and also by conducting lab sessions out at Forrestal for undergraduate courses. Two years later, however, Perkins admitted that the department still needed to make "a major effort to improve our contact with our undergraduate students, which suffers due to the distance separating them from the faculty."[76]

THE DECISION TO ACCEPT CLASSIFIED RESEARCH

With the Forrestal acquisition, Princeton had reversed its earlier policy of not separating advanced research facilities from the main campus. That same year, Princeton's opposition to accepting classified research also ended. For the past year, physicist John Wheeler had been participating in thermonuclear work at Los Alamos, but in 1951, he wanted to return to Princeton to create a new university research team. The idea of bringing secret thermonuclear research to Princeton stimulated intense discussion among faculty and administrators. The physics department's chairman initially told Dodds that he considered the project "unsuitable" for the university.[77] After further consideration, the physics faculty reluctantly agreed "not to oppose"

Wheeler's proposal, although members were still troubled by "the apparent dangers to the University" of classified research. They worried especially about the "intangible" danger that "highly guarded top secret work" would have a "stifling effect ... upon personal contacts, the exchange of ideas and the general frame of mind of the University community." The physicists added, "we are also concerned lest graduate students be deflected from basic science to applied technology. We feel that at the present state of the [national] emergency, applied war research should be carried on by scientists whose formal education is completed, and that the convenience of recruiting help from the Graduate School should not blind us to the crucial importance of providing first-rate training."[78] To minimize such complications, the physics department suggested that classified contracts contain "stringent provisos" specifying that no secret work could be performed in Princeton's main teaching and laboratory buildings and that graduate students could not be employed on classified projects.[79]

Dodds responded that the physics department's continuing doubt over the suitability of classified research "shakes my opinion considerably as to whether Princeton is the place for Professor Wheeler's project from either the government standpoint or ours."[80] But Dodds also had to consider the danger that professors might opt to leave Princeton if denied a free choice of research topics. He told the physics department, "defense projects are necessary, whenever ... possible and appropriate, as a means of holding our departments together, as well as making available the scientific capacity of our faculty for the defense effort .... [W]e want to do everything we can to hold our faculty organization all along the line, particularly during the transitionary period in which our student body and tuition revenue will be much reduced."[81]

The interpersonal dynamics of the situation apparently played a role in the decision-making process; Wheeler's character and scientific eminence affected consideration of whether or not the university should change established policies on secret research. Former Princeton president William Bowen commented that Wheeler's colleagues perceived him as "a very warm and engaging and appealing human being" who could be trusted to handle the problems of classified work in a capable manner. Because Wheeler had already won the regard of graduate students, faculty, and administrators, those "people ... had confidence in Wheeler that they might not have had in a lot of other people .... In a small community, personalities ... matter enormously; they overcome a lot of other resistances."[82]

By April 1951, Princeton had made the final decision and permitted Wheeler to begin his "Thermonuclear Assessment and Study Program," nicknamed "Project Matterhorn," which represented part of "Project Sherwood," the AEC's national Controlled Thermonuclear Program. In a letter to Harvard physicist Wendell Furry, Wheeler evaluated the dangerous international climate that he felt made this research necessary, saying, "My personal guess is an appreciable chance of war by September. You undoubtedly have your own probability estimate. You may be doing some thinking about what you will do if the emergency becomes acute. Or, like me, you may hope that entirely new weapon developments may produce what Churchill calls 'peace through strength.'"

Inviting Furry to participate in the project, Wheeler explained, "Princeton's job is to be idea factory and do primordial design, [while] Los Alamos [will] ... carry things through all the practical stages right to the end. The shortage of people on the idea assessment and primordial design end is to me terrifying. You would make percentage-wise more difference there than anywhere else in the national picture .... We intend to get together at Princeton a group of super-critical size that will really get somewhere." Wheeler called thermonuclear research "urgent" for national defense, ridiculing what he described as "the hair-shirt philosophy of many nuclear physicists—Nuclear physics is interesting; therefore, we mustn't work on it in case of war."[83] He urged Furry to remember such national security considerations when thinking about the future of classified research in American universities.

Observers at Princeton recognized that accepting classified military projects could drastically reshape the nature of the university's scientific and engineering schools. As the physics department noted in its 1951 review, "the outbreak of the Korean War and the resulting conviction that we are at best in for a long twilight zone of only nominal peace has had its effect upon the activities of this department."[84] One of the most distinctive features of Wheeler's new project was the evidence that modern scientific and engineering research were increasingly developing into large-scale interdepartmental undertakings; Matterhorn drew on faculty members not only in physics, but also in the departments of mathematics, electrical engineering and mechanical engineering.[85]

Within the next year, another major proposal further intensified the ongoing controversy over classified research at Princeton. Astrophysicist Lyman Spitzer had developed a new approach to controlled thermonuclear fusion and wished to apply for outside funding to begin experimentation.[86] Commenting on Spitzer's proposal, Joseph Elgin, dean of the Engineering School, declared, "basic research, particularly in a university, is best conducted without security classification and restriction of any sort; [this] cannot be questioned in principle."[87] Elgin reasoned, however, that Spitzer's case represented an acceptable exception to this principle, since the secret project was not being imposed on the university by the military but rather had originated with Spitzer himself and bore a close relationship to established department interests. Furthermore, Elgin cautioned Woodrow, the university ought not to carry the principle of avoiding classified work to extremes, lest it violate the principles of academic freedom and scientific progress. If Princeton prohibited Spitzer from pursuing his ideas because they fell under federal security classification, the university would in essence be "telling Professor Spitzer that either he must abandon his research interest in this field and work on something else, or ... that he must go elsewhere to conduct his research. This is unfortunate."

For Elgin, the solution would be for Princeton to allow Spitzer to pursue his work, but to stipulate that all classified research should be confined to the Forrestal Center. By segregating secret projects off campus, the physical barriers and other restrictions imposed by military officials would not affect Princeton's main buildings and ordinary undergraduate instruction. Elgin wrote, "I have always felt in my own mind that one of the purposes of Forrestal was to meet just such a case as we now have and thus prevent our faculty from being forced...to go elsewhere to work on important national problems or research in...heir major interests."[88] After further considering Spitzer's case, Princeton's leaders agreed that faculty members could accept classified work "when it was clear that the project would be of major importance and that Princeton was uniquely qualified to carry out the work." The new policy followed Elgin's recommendations and restricted secret research to Forrestal, "where security measures can be installed without appreciable interference with normal university activities."[89] Significantly, the new policy did not impose any explicit limitations on secret work during peacetime, so that Spitzer was permitted to continue his research long after the Korean emergency had ended.

The effect of these two major policy decisions at Princeton, to establish the Forrestal Center and to allow classified work, was that the size of sponsored research at Princeton more than doubled in just over two years. The amount of outside money soared from $1.3 million in 1950 to $3 million in 1952, 92 percent of which came from the federal government and 60 percent of which went to the Forrestal Center.

Throughout the Korean crisis, the federal government continued to exert pressure on Princeton's scientific and engineering departments to undertake research described as critical to American military strength. Representatives of the armed services expected Princeton's professors, like those at other leading universities, to devote their attention to problems of immediate national relevance, and many Princeton faculty members appeared quite willing to play their part. For example, in 1951, the ONR approached Princeton's physics department with a specific request for work on "Project Bird," a "short-term emergency project," which the physicists accepted without any apparent hesitation.[90] Furthermore, the department's study of shock waves was extended "to include work of more direct military application than the basic research ... [of] the past," leading to the direct participation of some professors in the Eniwetok tests.[91] Princeton physicists noted that military experts were especially interested in the "analysis of the diffraction of shock waves around rectangular objects, a study which has obvious practical importance" for observation and prediction of bomb damage.[92] By 1952, the physics department concluded that between their sponsored research on shock waves, Project Matterhorn, cosmic ray investigations and a few more efforts on behalf of the military and the AEC, "[t]he major part of [our] experimental research ... is supported by government contracts."[93] Moreover, federal research support was becoming increasingly important not just for the experimentalists, but for theoretical physicists; in 1958, Princeton's theorists arranged for a $42,300 contract with the Air Force, believing that they "would be freer to carry out their research if they could obtain ... financial assistance from an outside source."[94]

FURTHER EXPANSION OF SPONSORED RESEARCH: PROGRESS AND PROBLEMS

Through the 1950s, Princeton's sponsored research programs grew at a furious pace. In 1956, the AEC finally agreed to provide $5.8 million of the estimated $6.3 million total cost to construct a three-billion electron-volt synchrotron at Forrestal.[95] By 1958, the task of designing and building the new synchrotron required the efforts of "about eighty people."[96] Upon completion in 1963, Princeton's machine became only the third proton synchrotron in the country operating at energies over one billion electron-volts, joining Brookhaven National Laboratory's Cosmotron and Berkeley's Bevatron.[97]

Yet another leap in Princeton's sponsored research efforts occurred in 1956, when the AEC approved Spitzer's plans to build the Model C Stellarator, a large-scale machine designed for nuclear fusion tests.[98] As with earlier decisions on classified work, Princeton's leaders pointed to national factors to justify the university's involvement; Dodds declared that Princeton had agreed to develop the Model C only because "the national interest outweighs other considerations which might give us pause before a project of this magnitude."[99] Originally, the work of Project Matterhorn had involved only Wheeler plus a single assistant, but by 1958, work on the Model C required a seven-building laboratory and office complex to house its 230 workers, half professionals and half technicians, machinists, secretaries, and other staff.[100]

The aeronautical engineering department's 1950 level of $260,000 in sponsored research expanded to $2 million by 1962-1963, almost 70 percent of all the outside money directed to Princeton's School of Engineering.[101] In addition to major research agreements with the Army, Navy, and Air Force, the faculty had also obtained research funds from General Electric, Aerojet General, and the Air Reduction Company.[102] Surveying these developments, Woodrow commented, "Aeronautical engineering is an area where almost unlimited funds seem to be available to a good department."[103] This positive outlook for outside support reflected the favorable economic climate and the strong position of the American aeronautics industry at the time, which looked to university research as a source of potential applications. As the description of aeronautical engineering work in a 1957 report on Forrestal work explained, "Virtually all of the published results of research in this laboratory are of immediate use and value to the aircraft and missile industry. There is a steady stream of visitors from government and industry who call to inform themselves of the latest results and to discuss problems in areas of mutual interest." The report's authors insisted that Princeton's aeronautical research was "completely fundamental in nature. It is pure research and in no sense development work or applied engineering."[104] But a later section of the same report conceded that "[in jet propulsion and] aerodynamics, the line between pure and applied research is here very nebulous, and in many instances the only distinguishing criterion is that of motivation." Specifically, the report indicated that Princeton's analysis of vibration in rockets would help eliminate "screaming" (explosively destructive tremors) in the Nike guided missile.[105] Straddling this narrow line between pure and applied research, Princeton's engineers took pride in conducting what they preferred to call "pure" research, while still drawing heavily on federal and corporate interest in applied problems.

Although gratified by the expansion of their budgets and research programs, Princeton's physicists and aeronautical engineers were also sensitive to the complications entailed by the changing nature of their work. Some physicists worried that pursuit of sponsored research had altered the basic nature of scientific activity within the university; remarking on a fellow professor's leave of absence, Shenstone pointedly reported that the man had "spent a very profitable year ... chiefly devoting his time to the kind of careful thinking which is now so difficult in the usual academic year."[106] Furthermore, the department was aware that the pressure to complete research associated with military needs had sometimes sidetracked regular research priorities; the chairman noted that Princeton's shock wave researchers were "always in demand for ad hoc jobs which could swamp their efforts to be physicists."[107] As a consequence of accepting such large-scale sponsored research work, Smyth commented, "the most pressing problem the scientist faces today is how to balance his time between pure science, which is his true function, and applied science in the cause of national defense."[108]

The growth of large-scale sponsored projects also threatened to disrupt broader university structures and priorities. Spitzer was especially concerned that Princeton's physicists found it difficult to fit work on Project Matterhorn into the rest of the department's program. Without integrating Matterhorn and other Forrestal research with the department's educational mission, Spitzer complained, "the University is not presently receiving full advantage of the Matterhorn Project." As long as security concerns limited Matterhorn activities, Spitzer could not remedy the physical and programmatic separation between Forrestal and the main campus, but after Matterhorn was declassified in 1958, Spitzer raised $200,000 from the Ford Foundation to establish an interdepartmental doctoral program in plasma physics.[109] The new program brought together graduate students in physics, astrophysical sciences, electrical engineering, and aerospace and mechanical sciences;[110] work at Forrestal was a required component of training in plasma physics, and Matterhorn researchers reported that they appreciated the "inexpensive ... assistance" of graduate labor.[111] However, the physicists dominated the new group, which displeased the engineers, who wanted a more balanced plasma program. In 1962, Elgin complained that "one problem ... not yet resolved is the lack of faculty, competent in the electrical phases of plasma physics, to ... supervise electrical engineering graduate study. We have had to depend on the staff of the Plasma Physics Laboratory and thus far, these men have proved to be entirely too busy to devote much time to engineering graduate students."[112] Elgin blamed the inherent drawbacks of interdisciplinary efforts, noting that "departments are reluctant to relinquish their basic prerogatives to such programs and real departmental cooperation is always difficult to achieve."[113]

Development of a plasma physics course, as soon as security considerations allowed, showed Spitzer's desire "to avoid ... placing Princeton in the position of acting as only the management agent for the [AEC]."[114] This view, shared by other faculty and administrators, resulted in a persistent tension between the university's goals and the federal government's interests. Although the AEC hoped that Matterhorn research would ultimately be applied to the development of a commercially viable fusion reactor, Princeton's faculty viewed the project as enabling them to work "in basic plasma physics research ... [and be] drawn as closely as possible into normal University channels, particularly with respect to graduate students and faculty appointments."[115] Although in reality the work at Princeton tiptoed around the edges of applied science, faculty and administrators still preferred to think of it as pure science. While Princeton's classified research had started with Wheeler's involvement with development of the hydrogen bomb, in later years, especially under Spitzer, projects had come to encompass broad research on the nature of plasmas and energy. Because Princeton's physicists wished to be seen as concentrating on basic research, when the work was declassified in 1961, they officially changed the old military code name "Project Matterhorn" to "The Plasma Physics Laboratory."[116] Similarly, in 1966, the "Forrestal Research Center" was formally renamed the "James Forrestal Campus of Princeton University." University officials explained that the change was intended "to clearly ... identify Forrestal as a geographical section, hence "Campus" of the University. Over the years 'Research Center' had connoted a degree of difference from the rest of the university which in fact had never existed."[117]

But vital differences had always existed between Forrestal and Princeton's main campus; in addition to the physical distance between them, the separation of projects, personnel, policies, and priorities had caused tension and uncertainty for both faculty and administrators. As early as 1952, Princeton administrators noted that while Forrestal's initial plans called for some aeronautical engineers and chemists to collaborate on Project Squid research, this vision of harmony was belied by the fact that "relations between various departments, particularly Chemistry and Forrestal, are extremely poor."[118] Concern about the danger of splitting the university became even more evident in 1953, when Sayre opposed the idea of establishing a faculty committee at Forrestal because he was "reluctant ... to take any steps which might have been interpreted on the Main Campus as an evidence of 'separatist tendencies' on the part of the Forrestal Center." He added, "I feel...that our critical faculty relations problem is not among the faculty already working at Forrestal, but with the departments and Main Campus faculty who have not yet had an opportunity really to know the possibilities of work at Forrestal."[119] But delaying the creation of separate faculty meetings in the 1950s and changing the name to "Forrestal Campus" in the 1960s could not hide the fact that Forrestal remained both physically and operationally isolated from the rest of the university. The aeronautical engineering faculty found the situation particularly vexing; they were still trying to coordinate and unite their Forrestal research work with their teaching obligations on the main campus. The department experimented with bringing laboratory sessions of some courses out to Forrestal, which Perkins asserted in 1956 had "greatly improved" the faculty's relationships with undergraduates. He wrote, "The students seem to enjoy their contact with ... Forrestal .... Because aeronautical engineering students are the only group in the University having contact with the Research Center, we find an apparent esprit' de corps existing among them. This is certainly highly desirable from our point of view."[120] The department even arranged to hire some sophomores, juniors and seniors for part-time employment on Forrestal research projects. But the "esprit' de corps" supposedly uniting aeronautics majors also divided them from their fellow undergraduates, and professors found it difficult to conduct different parts of the same course in two separate locations.

In fact, sponsored research created headaches not only for the departments immediately involved, but for the entire university. The postwar flood of money and attention directed toward science and engineering threatened to create a disturbing imbalance on a campus traditionally oriented toward the humanities. As Sayre had predicted back in 1950, Princeton's scientists and engineers had "financially exploited" Cold War tensions to attract impressive amounts of research money from both government and industry, but the effect of this sudden wealth was to leave the humanities and social sciences at Princeton feeling comparatively deprived. Dean of the Faculty Douglas Brown described the resulting discontent, saying in 1952 that the social sciences reminded him of "a small boy, Little Willie, the son of Mother Humanities who brought up the family and maintained the old traditions while Papa Science payed [sic] the bills. Recently, however, Mother Humanities, worried by Papa Science's extravagant living and his disposition to spend the family fortune riotously, had sent Little Willie down to the saloon to bring Papa home."[121] Brown's analogy emphasized the growing strain between different divisions of the university: The humanities and classics departments were conscious of the shifting balance of campus power and the redistribution of resources, that appeared to threaten honored Princeton traditions and established principles. Given the new money and prestige of sponsored research in science and engineering, it seemed almost inevitable that interdisciplinary dynamics would be affected in ways occasionally both painful and chaotic.

Princeton's president hastened to reassure observers that the new prominence of science both in the university and in society actually made the humanities more vital than ever. Dodds drew on the cultural concerns of the Cold War to try to create a compelling new mission for the humanities and social sciences that would surround them with a sense of importance to balance the growing weight of science and engineering. To some extent, Princeton's social science and humanities departments did redefine their programs to fit the postwar era; in 1951, the Modern Languages Department added a new program in European Culture and Civilization, aimed at teaching students to appreciate "that the future of America is bound up with ... Western Europe." That same year, Princeton's Woodrow Wilson School for public policy created a new Center of International Studies, which almost immediately launched a program of foreign policy analysis, including a special "inquiry into the appeal of Communism."[122] On a broader level, Dodds visualized the purpose of the humanities in modern higher education as molding great leaders who could serve as moral guides for exercising the new forces of science and technology which had been unleashed. Dodds commented in 1952:

> The more new ways we discover for harnessing nature for the good of mankind, the more we fear that people will use the new knowledge to destroy each other. What we happily and ' proudly used to call the Engineering Age has turned itself into the Phenobarbital Age ... so devastating has been the worship of natural science as the way to salvation .... The prescription is to strengthen the position of the humanities in our educational process, and thus ... rectify the imbalance of ideas ....[123]

To prevent Princeton's humanities departments from feeling like second-class citizens of the university, in 1953 Dodds created a special Council of the Humanities to raise a $7 million endowment for research and graduate fellowships. He asserted the basic principle "that the three basic divisions should keep pace with each other and [avoid any] unfortunate imbalance."[124] A few faculty members in the social sciences were able to claim a small share of military funds for sponsored research; for example, one Princeton psychology professor conducted studies for the Army Air Force on "the psychological and physiological factors which affect the accuracy, speed and stress of reading and interpreting scales, graphs, dials and tables used in aircraft."[125] On the whole, however, Princeton's humanities departments continued to express a more traditional orientation, and the growing financial imbalance between divisions remained a source of unhappiness and controversy within the university.

Princeton's administration also had to cope with new complications resulting from the expansion of classified research, especially issues of personnel and security clearances. In 1953, Princeton's physicists complained of "serious interference" when government authorities disapproved of their choice for the new head of a secret project. The physicists rebelled against what they saw as a heavy-handed display of outside control, protesting that the government had never bothered to explain why they vetoed Princeton's candidate. The ensuing struggle revealed the underlying tension between the university researchers and federal officials over the control of sponsored projects. Although the armed forces paid the bills and maintained final jurisdiction over security, Princeton's faculty still claimed traditional academic prerogatives, including the basic freedom of scholarly research. The research contract for that secret project was almost cancelled, due to the conflict over personnel, and only some adept political maneuvering on the part of Princeton administrators saved the program.[126] But the clash of wills over controlling sponsored research continued; in 1953, AEC chairman Lewis Strauss advocated tightening security around university researchers, saying, "too much security when realized can be corrected by relaxing it. Too little security, when *it* is realized, is beyond correction."[127] Princeton's faculty continued to chafe under federal restrictions, especially limits on contacts with foreign colleagues.

Expansion of Project Matterhorn also exacerbated Princeton's personnel problems. Formerly, salaries for professional staff had been computed in relation to faculty salaries, but in the mid-fifties, Princeton had difficulty attracting and retaining top scientific and technical professionals. University positions could not compete with well-paid openings in industry and federal labs. To make the matter worse, staff members were not eligible for benefits commonly offered to Princeton faculty, such as publication rights, housing support, and opportunities for consulting work. To address the personnel crisis, Woodrow studied the situations at MIT and Johns Hopkins and discovered that those universities had established special two-tier staff systems that provided group research workers with "salary scales considerably higher than for the normal academic appointments."[128] Princeton officials decided to restructure their personnel system in a similar fashion, creating a new category of special appointments, called "Project Research Staff,"[129] with salary calculated on what was known as the "Los Alamos curve." However, this move proved "only partially successful" in solving personnel problems, since the university never clarified exact details of the status of Project Research Staff. The issue was not simply money, but also prestige; as one administrator noted, "[t]he omission of the magic word 'professor' is keenly felt" among the research staff.[130] The situation was further complicated because "different departments ... [were] using different criteria" for evaluation and promotion of the professional staff.[131] Throughout the early 1960s, recruiting and keeping talented staff members on Princeton's sponsored research projects remained "a thorny problem,"[132] even involving a 1959 attempt by the United Auto Workers AFL-CIO to unionize Project Matterhorn's maintenance, shop and laboratory staff.[133]

The growing popularity of industrial consulting work in the postwar period had also complicated matters by raising the income of many science and engineering professors beyond what either humanities faculty or the professional staff could readily earn. Most of Princeton's aeronautical engineering professors served as consultants for at least two companies, officially devoting one day per week to consulting; some faculty members held as many as six different consulting positions. General Electric, General Motors, RCA, and North American Aviation Inc. all employed several Princeton professors; Boeing, United, Northrop, Republic Aviation, and Aerojet General also hired members of the aeronautical engineering department.[134] The time spent on outside consulting raised new questions about professors' responsibilities to students and to the university itself. Princeton's chemistry department chairman expressed some qualms over what he described as the growing "projectitis" of university science:

> In a science as closely coupled as chemistry is to industry and big business, it is becoming increasingly difficult to assure that

> motivation in research remains true to the pursuit of knowledge for its own sake. During the war there was an obligation, and there remains a temptation to go for limited objectives which may have immediate application. If a research contract or a consulting agreement results, another promising investigator has succumbed to 'applicitis' or 'consultitis' or both. The disease is aggravated by grim problems of personal budget balancing, and by the disparity between academic and industrial salaries.[135]

Since the university remained the primary employer in such cases, the chairman suggested, Princeton officials were entitled to ask, "how can the Department (and the University) be assured of faculty interest primarily directed to teaching and scholarly pursuits without being accused of ivory-tower ideals?"[136] Accusations of ivory-tower ideals aside, he believed that Princeton had a right to take "[p]recautionary measures" in the event that "a member of the faculty becomes increasingly absent on consulting visits."[137]

By the late 1950s, some Princeton faculty and administrators worried that between consulting work and large sponsored-research programs, the physics and aeronautical engineering departments had become overextended. In an effort to control sponsored research and to address unresolved questions about the proper place of outside work, Princeton dissolved the old Committee on Project Research and Inventions, which had been composed entirely of faculty from the sciences and engineering. In its place, Princeton created a new University Research Board, with members drawn from all university divisions to reflect the growing conviction that the entire school deserved a voice in determining the future course of sponsored research within the institution.[138] But although the new committee included representatives from the humanities and the social sciences, it does not appear that the group made many significant alterations in the university policies on sponsored research or challenged many new proposals.

By the late 1950s, Princeton was fully tied in to the system of research supported by the federal government. Although Woodrow, Sayre, and others had frequently mentioned the need to attract funding from industries and foundations to diversify Princeton's base of outside support, throughout the 1950s and 1960s, the federal government accounted for much the greatest share of sponsorship. In 1952–1953, the sixteen projects sponsored by corporations accounted for only 4 percent of Princeton's total $3 million in outside research support, while private foundations supported fifteen projects amounting to just 2 percent of the sum. The federal government, funding 73 different projects, supplied 94 percent of Princeton's sponsored research money, of which 41 percent came from the ONR, 24 percent from the AEC, 15 percent from the Air Force, 12 percent Navy, 7 percent Army, and 1 percent from the National Science Foundation (NSF), State Department and other agencies.[139] By 1965, most of Princeton's sponsored research income of $28.5 million still came from government and went primarily to the sciences and engineering. The Plasma Physics Lab alone cost $7.2 million a year to operate and the Accelerator $5.2 million. While some faculty members had expressed reservations back in the early 1950s about having large sponsored projects associated with the university, prevailing opinion had shifted over the years to an increased willingness to accept the new situation, or at least the feeling that it was useless to fight developments. Fears about the impact of sponsored research, especially classified subjects, on the educational climate and academic mission of the university had become of secondary importance. Princeton's scientists and engineers, as well as administrators, were quick to emphasize that modern experimentation demanded large-scale equipment and investment. They argued that the university gained important benefits from establishing ties to outside institutions and contended that sponsored research helped maintain Princeton's reputation as a vital center of scientific and engineering leadership. The university concluded that it would be unfair to deny faculty members the right to select research topics regardless of security or funding restrictions and that it would be improper, even unpatriotic, to deprive the government of access to some of the best minds in the country on problems of national security.

This shift in attitudes was evident in the way the changing views of physicist Henry Smyth on the appropriateness of sponsored research at Princeton. In 1953, Smyth said that the immediate military emergency in Korea was the only factor that justified the university's move to expand federal research work. By 1959, however, he fully endorsed sponsored research without referring to national security as justification, saying that since university professors could make vital contributions to basic knowledge in science and engineering but required financial assistance to do so, "therefore it is to the mutual advantage of the Federal Government and the universities to have research done at universities and paid for by ... Government."[140] He pointed out that federal money had come to play an essential role in university programs, in the sense that if government financing were abruptly removed, "it is hardly conceivable that an additional 2 [and] 3/4 million dollar income from endowment could be achieved annually for the Physics Department."[141] Smyth's perspective underlined the extent to which Princeton had become dependent on outside money by the late 1950s, since "big science" research programs simply did not see any alternate source of the funding critical to their survival. In 1965, the University Research Board commented, "In 1946 ... we had no conception of the magnitude of the work [which would be] supported by the federal government ... in the coming years."[142] Smyth added, "Perhaps we could have chosen not to accept Federal support, though I shudder to think what would have happened had we done so."[143]

THE BOWEN REPORT

Although sponsored research had found greater acceptance at Princeton by the late 1950s, that did not mean that the university faculty and administration ignored still-open questions about the impact of outside funding on the university's structure and purpose. In 1961, Robert Goheen, Princeton's new president, "felt that enough had transpired in terms of the relationships between the university and federal government entities that it was time simply to take stock; ... a recognition that there was ... a lot of money coming in and it was important to try to understand how these funds had affected the functioning of the university."[144] Accordingly, at Goheen's request, economics professor William Bowen began a major internal review of exactly how sponsored research had affected Princeton's financial status, educational programs, and intellectual climate. Bowen's 300-page study, *The Federal Government and Princeton University*, set forth both the advantages and disadvantages of sponsored research, drawing on official university reports and financial records, plus questionnaires and interviews with administrators, faculty and graduate students.[145] Bowen began with an "overall financial appraisal" showing that government funding for science and engineering had opened up more internal university resources for other departments, so "that the non-supported areas have also benefitted from Princeton's financial involvements with the Federal Government."[146] Government money had come to account for a high proportion of university revenue, $28 million in 1959–1960, while student fees provided only $5 million and endowment $4.5 million. Bowen did not consider this increased reliance on federal support as a reason for great alarm, since he indicated that a sudden, wholesale withdrawal of government backing would be "highly improbable ... —it is unlikely that all Government sponsors would simultaneously become discontented with work at Princeton."[147] Bowen was troubled, however, that sponsored research had increased pressure on Princeton's physical facilities and support services, imposed sizable indirect costs not reimbursed by government, and inflated university salaries. Although faculty members in science and engineering might appreciate the inflated salaries as a means of keeping pace with the higher levels of remuneration in private business, Princeton's administration regarded skyrocketing salaries as a serious strain on the university's endowment and budget. On balance, though, Bowen decided that sponsored research represented a net financial gain for Princeton, effectively "more than doubl[ing] the financial capacity of the University as a whole."[148] Government funding had allowed the physics and aeronautical engineering departments to increase their graduate programs "without worrying at all about the danger of coming up against a financial ceiling on the number of students that could be supported."[149] Furthermore, outside money helped provide doctoral students with better access to research equipment and more generous stipends.[150]

Bowen cautioned, however, that "the dangers arising from the growing dependence on Government sponsored research money are not so much financial ... as operational .... [T]he danger is that the University may suffer some loss of control over the character of its own activities."[151] He pointed to evidence supporting Woodrow's earlier fears that faculty might be "bought" by government money, either forced or enticed to sacrifice their original research interests in favor of projects the AEC or Department of Defense were willing to finance. Especially in the engineering departments, Bowen recorded cases in which "both the topic of research and the approach ... have been influenced ... by outside sponsors."[152] One engineering professor told Bowen that "an Army sponsor has tended to view his research group as an offshoot of the Army and has complained from time to time that Princeton has not been doing the job the Army needs done. Recently, this particular sponsor rejected parts of a proposal on the ground that there was not enough 'hardware' emphasis."[153] Federal funding had also biased the direction of graduate students' research; in Bowen's questionnaires, 17 percent of science graduate students reported that the prospects of receiving government money had been a factor influencing their selection of research topics. One student wrote, "some professors have research assistantships available, others do not. It behooves a man to do his thesis work under one ... who has such assistantships ...." Another commented, "the availability of funds for particular types of research which support particular points of view is a great attraction to one dependent upon financial support. I have been successfully tempted."[154]

Bowen was deeply troubled by several aspects of sponsored research, especially the way the disproportionate funding of scientific and engineering work had created "morale problems within certain departments and ... frictions between departments." It was not only professors, but also the graduate students who expressed resentment over the unequal distribution of resources. As government funding had grown to play a larger role at Princeton, the average graduate student in science or engineering received $1,400 to $1,600 in support, compared with $700 for humanities students. However, Bowen's questionnaires revealed that dissatisfaction with the amount of financial support was actually higher among the scientists and engineers than among humanities students. He suggested that the explanation lay in the varying expectations of the two groups: "Engineering students are conscious of the fact that they are abstaining from well-paying jobs in order to do graduate work while students in the Humanities are resigned to a 'leaner' way of life as a long-run condition."[155] Bowen concluded, however, that the university could do little to redress such inequities, since the endowment and other internal sources of funding would not support all departments at levels equivalent to the high government sponsorship for physics and engineering. In the end, he observed, "the University will have to continue to live with the imbalance problem."[156]

Bowen declared that after weighing all these financial, organizational, and attitudinal factors, it appeared that sponsored research had deprived Princeton of valuable institutional independence, making its well-being "far more dependent on the good sense of Congressmen and ... Government agencies than was the case prior to World War II."[157] However, he concluded that on the whole, the university had still benefitted from the decision to accept large-scale sponsored research projects, which had made it possible to expand both the faculty and research programs, helping maintain Princeton's reputation as a leading university and supporting a better education for both undergraduate and graduate students.

CONCLUSION

The historical significance of the development of sponsored research at Princeton can be appreciated by contrasting it to the case of Stanford, which has received a greater share of attention from historians. As Leslie has detailed, Stanford's transformation was largely due to Terman's drive to enhance his institution's reputation and multiply its resources, motivated by the vision of making his university a West Coast rival to MIT, famous for large-scale, interdisciplinary research projects and enhanced graduate programs.[158] Stanford's leaders actively embraced sponsored research as a calculated maneuver to gain institutional prestige through science and engineering. By contrast, Princeton's leaders had agreed on no such overarching vision of government research funds for science and engineering transforming their university. Instead, Princeton's course emerged through a series of independent decisions, short-term thinking and compromises, which often bore unanticipated consequences.

The absence of conscious, long-term analysis at the university level was not the fault of Princeton's physicists and aeronautical engineers; after World War II, Wheeler, Smyth, Sayre, and other faculty members had worked to define a postwar agenda for their own departments. In his article "Physics Between War and Peace," Peter Galison has noted, "from the war, physicists had inherited a new sense of mission-directed, team-executed research that required a new human architecture as well ... to lead interdisciplinary nuclear physics programs."[159] Similarly, Princeton's aeronautical engineering department specifically set out to build up a postwar program centered on new principles of jet propulsion, supersonic speed, and flight testing. The difficulty was that while the war had provided a new direction for the shape of work in science and engineering, the World War II model did not supply a blueprint for how these new types of physics and aeronautics programs should fit into a broad university structure.

The problem of incorporating these large-scale, interdisciplinary, and expensive research projects into the established university system largely fell to the administration, but Princeton's governing structure was not prepared to manage the adjustment. Members of the administration themselves recognized this fact, yet still never mastered the complications of incorporating postwar sponsored research into the Princeton community. Writing as an economist trained to observe institutional decision making, Bowen described the development of Princeton's policies on sponsored research as an *ad hoc* operation and cautioned in 1962 that if this pattern continued, it would create future problems for the university. He emphasized "the dangers of paying too little attention to administrative matters— and particularly to the planning and decision-making process." Bowen was especially disturbed that the escalating demands on the university president's time meant that "he finds himself forced to react rather than to consider." While the president and other administrators were preoccupied with short-term decisions, the need to reflect on the university's long-term direction was neglected. To reinforce this point, Bowen cited an administrative memo that read, "We have become accustomed to doing a lot of navigating around here by guess and by God just because we don't have time to think out our problems or the people to undertake studies on which decisions should be made." Bowen quoted one engineering professor as saying, "the University has backed into almost all of the most important decisions it has made in the last decade. There is an absence of planning or of conscious decision-making with an idea of where we are going in the future. Instead, decisions are made when crises occur, and the University simply reacts to problems." From this evidence, Bowen concluded that "the present administrative mechanism is inadequate" for handling vital considerations associated with the development of sponsored research and noted, "It is somewhat surprising that an institution as devoted to research as Princeton does so little in the way of systematic research into its own problems."[160]

Reflecting in later years on Princeton's decision-making capacity in the postwar period, Bowen confirmed the view that the university had "backed into" its adoption of large-scale sponsored research, adding that "backing into" that type of decision "was very common in those days." He recalled, "at essentially all universities ... planning processes as we think of them today were really not used then very much by anyone. Things were very simple, ... there were not the kinds of sophisticated budgetary processes that one just finds routinely today. There was no effort to project ahead, there was simply ... not the machinery of decision-making that we see now."[161]

Princeton was undergoing major changes in the postwar era with the growth of sponsored research, which affected the university financial situation, undergraduate teaching and graduate education, faculty responsibilities, policies on classified work, and even the physical appearance of the university. But Princeton's decision-making structure did not keep up with the rapid changes; its leaders maintained an older style of interaction, in which simple feelings and instincts played a large role. The president, financial vice-president and the dean of the faculty simply "knew a lot about the place and about the people who were in it ... so it was just felt less necessary than later to do everything in a rather methodical way.[162] The close friendships and professional trust previously built up between Princeton's administrators and key faculty members allowed an informal policy-making style, which, while easier in the short term, could present difficulties over the years.

It was not that faculty and administrators did not have a sense of the crucial questions arising from the growth of sponsored research. Ever since World War II, Princeton's faculty and administrators had been aware of both the philosophical implications and practical complications resulting from the decision to accept outside work. The issue ultimately raised basic issues about the proper nature of an institution of higher education. As Goheen said in 1965:

> A ... distinguishable tension in the modern university is the pull between ... the commitment to fundamental learning [and] ... responsibility toward pressing immediate requirements of the society that gives it life .... [A] university is a delicately balanced entity, and no university structure has yet been devised that can preserve this balance without a considerable measure of forbearance and responsibility on all sides.[163]

Princeton was indeed delicately balanced; the community had committed itself to preserving a top-quality undergraduate education and excellence in the humanities, despite the increasingly mismatched distribution of resources and power toward graduate education, research, and leadership in physics and engineering.

Immediately following World War II, some of Princeton's professors and administrators, recovering from the conversion of university faculty and facilities to wartime conditions, expressed a desire for the campus to revert to the status quo ante. They were afraid that sponsored research, especially secret military projects, might destroy the highly prized professional freedom and the openness of academia, threatening to undermine the quality of undergraduate education Princeton had built up over generations.

But even while Woodrow, Smyth, and the Harbison committee were deploring the dangerous effects of sponsored research on the university and its undergraduate teaching, Princeton had already started "backing into" outside contracts. The aeronautical engineering department's Project Squid and the physics department's accelerator were launched without any real challenge and without any explicit consideration of the consequences for the university as a whole. After 1950, with defense agencies pressuring professors to undertake projects believed vital to the Korean war effort, Princeton's scientists and engineers quickly decided to enlarge their short-term, military-sponsored operations, which represented what Geiger has termed "critical technologies" in the Cold War context. The crisis atmosphere left little time for the university community to debate the long-term ramifications of adopting more sponsored research, and references to national security tended to override remaining qualms. The empowering new wealth in science and engineering and by the excitement of creating the Forrestal Center overshadowed the Harbison Committee's warnings about the quality of undergraduate education.

Even after the Korean situation had been defused, the new Forrestal Center made Princeton's leaders feel that they had already committed the university to accepting sponsored research. Sayre's optimism about perpetual access to government money for national defense, joined by Woodrow's confidence that Princeton could tap into corporate support just as Cal Tech and MIT had done, covered any lingering doubts about the possibility of expanding sponsored research at Princeton. As Bowen has noted, Princeton's entry into large-scale sponsored research work occurred at a time "when in the main, financial considerations were favorable, resources were increasing, [and] universities were well-regarded."[164] Woodrow, Sayre, and other Princeton leaders felt that little could go wrong with their new venture, never pausing to determine precisely how this new government and industrial support would fit into existing campus arrangements.

In fact, large-scale sponsored research could not automatically fit into the existing university, given Princeton's policies against secret work and its tradition of emphasizing undergraduate education. Without admitting how much government work violated such norms, Princeton gradually overturned its own policies and traditions through a series of compromises. The faculty and administration edged toward new attitudes, allowing Wheeler's thermonuclear research as an initial exception to the policy against classified work and then extending further permission for secret research until the initial policy had effectively become meaningless. Purchase of the Rockefeller site facilitated such policy compromises, since the physical distance between the new facility and the main campus neutralized concerns about security restrictions, defeating one argument of those wishing to keep classified work out of the university.

Princeton's relationship with sponsored research followed a common pattern; projects were carried along by the physicists' and engineers' excitement over the future of work in their fields, combined with optimism about attracting corporate support and a sense of national obligation during the Cold War. Rather than dealing with the large questions and institutional complications associated with the new sponsored research, Princeton's leaders, accustomed to an informal style of decision making, allowed policy to evolve through short-term decisions, which obscured the long-term perspective. It was not really until the 1962 Bowen report that Princeton completely faced how much classified work and outside funds had changed the traditional university since World War II. But although Bowen confirmed that sponsored research had eroded Princeton's independence, too many interests had a stake in government funding by that time to threaten the continuation of sponsored projects. Faculty and administrators ended up arguing that the benefits of sponsored research far outweighed the costs, pointing to the expanded graduate program, greater financial resources, institutional prestige, and intellectual contributions resulting from outside work. Even more important, Princeton's scientists and executives regarded the growth of sponsored research as not only beneficial, but even inevitable, as in Smyth's comment, "I shudder to think what would have happened" had we "chosen not to accept Federal support." It seemed impossible to escape the escalating costs of scientific and engineering equipment or the postwar trend toward "big science." Princeton's physicists felt that in order to keep up with scientific progress and with other universities, they had no choice but to build an accelerator, while Dodds felt he had no option but to permit Wheeler and Spitzer to pursue their classified research in order to keep faculty at Princeton. By the early 1960s, the university had built a huge research and administrative staff, physical plant, and store of equipment, the maintenance of which all depended on outside money. Princeton's fusion project formed part of an international research network; the physicists had built careers centered on this sponsored work, while America's reputation for nuclear science depended in part on Princeton's laboratories. Princeton's Cold War history illustrates a series of essential changes taking place in how and where some kinds of knowledge were being constructed; a financial and cultural shift away from the traditional library, seminar room and small-scale laboratory, toward the new concentration of big science out at Forrestal. Back in 1951, a *New York Times* reporter had waxed eloquent about Princeton's Guggenheim Jet Propulsion Center as "probably the only ivy-covered rocket pit in existence," illustrating the article with a photo of tie-wearing undergrads perusing open books on the lawn in front of the engineering building's ivied wall.[165] Physically, ivy could mask the exterior of the advanced rocket pit, but it could not conceal the noise, vibrations, light, or other intrusions that large-scale modern engineering and physics research imposed on the quiet atmosphere and traditional ambiance of Princeton's main campus. In the end, Princeton's aeronautical engineers ended up moving research out of the ivy-covered main campus buildings into a physically separate complex.

Princeton's embrace of what Geiger has called the "Autonomous research mission"[166] meant the creation of a distinct new set of financial, administrative, physical, and cultural operating procedures. While Princeton never abandoned its traditional commitment to undergraduate education, the university never fully acknowledged how much established policies and priorities had changed to accommodate the new sponsored research. While faculty and administrators were aware of the serious questions raised by sponsored research, they devoted relatively little attention to resolving the resulting doubts and tensions. Instead of planning a coordinated strategy to integrate scientific and engineering research within the established institutional framework, Princeton's leaders "backed into" sponsored research in the late 1940s and early 1950s. Though "navigating ... by guess and by God," the university ended up redefining the physical structure, intellectual climate, and social community of traditional Princeton for the rest of the twentieth century.

NOTES

[1] The author wishes to express her gratitude to Roger Geiger, Stuart Leslie, Alan Marcus, and George McJimsey for many helpful comments and to thank the National Science Foundation for support during preparation of this article.

[2] "Report to the President, Aeronautical Engineering Department, 1969-1970" (Princeton University, 1970), 9; Princeton University Archives [PUA].

[3] Henry D. Smyth, "Sponsored Research: Millions of Dollars for 'The Hire Learning' Raise Problems of Policy," *Princeton Alumni Weekly*, May 22, 1959, 7. The subtitle of Smyth's article served as inspiration for the title of this piece.

[4] Roger Geiger, "Science, Universities, and National Defense, 1945-1970," *Osiris*, second series, 1992, 7: 26-48; 31, 48.

[5] Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York, N.Y.: Columbia University Press, 1993); and Roger Geiger, *Research and Relevant Knowledge: American Research Universities Since World War II* (New York, N.Y.: Oxford University Press, 1993).

For MIT's history, see Stuart W. Leslie, "Profit and Loss: The Military and MIT in the Postwar Era," *Historical Studies in the Physical and Biological Sciences*, 21 (1990): 59-86. See also S. S. Schweber's "Big Science in Context: Cornell and MIT," *Big Science: The Growth of Large-Scale Research*, Peter Galison and Bruce Hevly, eds. (Stanford, Calif.: Stanford University Press, 1992), 149-183; and Geiger, *Research and Relevant Knowledge*, 63-73.

On Stanford, see Stuart W. Leslie, "Playing the Education Game to Win: The Military and Interdisciplinary Research at Stanford," *Historical Studies in the Physical Sciences*, 18:1 (1987): 55-88. See also Geiger, *Research and Relevant Knowledge*, 118-135.

[6] Rebecca S. Lowen, "Transforming the University: Administrators, Physicists, and Industrial and Federal Patronage at Stanford, 1935-49," *History of Education Quarterly* 31:3 (1991): 365-388.

[7] Peter Galison, Bruce Hevly and Rebecca Lowen, "Controlling the Monster: Stanford and the Growth of Physics Research, 1935-1962," *Big Science*, 46-77. For further discussion of Stanford's postwar development, see W. K. H. Panofsky, "SLAC and Big Science: Stanford University," in the same volume.

[8] In a 1991 undergraduate thesis, Russell Olwell has investigated the history of Project Matterhorn and Princeton's nuclear physics programs during the eight-year period from 1945 to 1953. Although Olwell's research on Project Matterhorn is excellent, his work does not fully integrate the history of Princeton's nuclear physics programs with parallel developments elsewhere in the university and does not pursue the changing effects of sponsored research at Princeton University for the period after 1953. The relationship between sponsored research and ongoing structural and academic change in the university deserves further attention, and comparisons to the history of sponsored research at Stanford and elsewhere need to be explored. Russell Brian Olwell, "Science in a 'Time of Crisis'" (Princeton University, undergraduate thesis, 1991).

Paul Forman's 1987 article "Beyond Quantum Electronics" uses the history of the Forrestal Research Center to illustrate his description of the manner in which military sponsorship altered the nature of research in American physics after World War II. Paul Forman, "Beyond Quantum Electronics: National Security as Basis for Physical Research in the United States, 1940-1960," *Historical Studies in the Physical Sciences* 18:1 (1987) 149-229.

[9] "Aeronautical Science and Engineering at the James Forrestal Research Center" (Princeton University, November 2, 1951); file "Forrestal Center" [PUA].

[10] *Princeton Alumni Weekly*, June 8, 1945; 3.

[11] "Engineering at Princeton: Aeronautical," *Princeton Alumni Weekly*, February 18, 1949; 14.

[12] Princeton remained the center for Project Squid until 1962, when Princeton and the Navy jointly decided to move the work to the University of Virginia. "Annual Report of the University Research Board and the Office of Research Administration for 1961-1962" (Princeton University, 1962), 3 [PUA].

[13] "Cane and Guggenheim Donate Near Million," *The Daily Princetonian*, December 14, 1948.

[14] Princeton's alumni magazine recalled in 1945 that "the sudden exodus of this group [of physicists to New Mexico] puzzled Princetonians, particularly the landlords involved, who were further mystified when letters received from the departed scientists continued to bear Princeton post-marks." "Princeton and the Bomb," *Princeton Alumni Weekly*, September 28, 1945, 7, 12.

[15] Quoted in Peter Galison, "Physics Between War and Peace," *Science, Technology and the Military*, E. Mendelsohn, M. R. Smith and P. Weingart, eds. (Boston, Mass.: Kluwer Academic Publ., 1988).

[16] "Princeton's Cyclotron," *Princeton Alumni Weekly*, November 24, 1950, 6-7.

[17] "Physics Department, Report to the President, 1950-51" (Princeton University, 1951), 10 [PUA].

[18] "Physics Department, Report to the President, 1952-52" (Princeton University, 1953), 1 [PUA].

[19] Raymond J. Woodrow, "Sponsored Research at Princeton," *Princeton Alumni Weekly*, February 10, 1950, 4.

[20] In 1946, other members of the new committee included Henry Smyth, chairman of the physics department; Kenneth Condit, Dean of the Engineering School, and George Brakeley, Princeton's vice-president and treasurer. "Weighing Science Policy," *Princeton Alumni Weekly*, March 15, 1946, 5.

[21] Hugh Scott Taylor, "The Next Decade," *Princeton Alumni Weekly*, May 16, 1947; 7-9.

[22] Raymond Woodrow, "Sponsored Research at Princeton," 8.

[23] Henry D. Smyth, "Physics at Princeton," *Princeton Alumni Weekly*, February 13, 1948, 5-7.

[24] "Princeton and the War," *Princeton Alumni Weekly*, November 16, 1945, 5-6.

[25] "Physics Department, Report to the President, 1949-50" (Princeton University, 1950), 8-9 [PUA].

[26] "Physicists Develop Measuring Device," *Princeton Alumni Weekly*, June 7, 1946, 7.

[27] "'The Future of Nuclear Science': A Bicentennial Conference Review," *Princeton Alumni Weekly*, November 15, 1946, 4.

[28] *Ibid.*, 4-5.

[29] *Ibid.*, 5-6.

[30] *Ibid.*, 6-7.

[31] Henry D. Smyth, "Sponsored Research," 7.

[32] Raymond Woodrow, "Sponsored Research at Princeton," 9.

[33] "Supersonic Wind Tunnel Dedicated," *Princeton Alumni Weekly*, February 10, 1950, 10.

[34] Harbison Committee Report, *Undergraduate/Faculty Relations at Princeton*, Princeton University, 1950.

[35] *Ibid.*

[36] *Ibid.*

[37] "Engineering at Princeton: Aeronautical," 12.

[38] Raymond Woodrow, "Sponsored Research at Princeton," 5.

[39] "Engineering at Princeton: Aeronautical," 11.

[40] For background on the general Korean-era mobilization of military research, see Daniel Kevles, "K1S2: Korea, Science, and the State," *Big Science*, 312-333; and Paul Forman, "Beyond Quantum Electronics."

[41] "The Activities of the Aeronautical Engineering Department for the President's Report, 1949-50" (Princeton University, 1950), 2-3 [PUA].

[42] Shenstone to R. C. Gibbs, September 18, 1950; file "Physics Department" [PUA].

[43] Sayre to Dodds, September 1, 1950; file "Aeronautical Engineering" [PUA].

[44] Sayre, "A Proposed Center of Aeronautical Research at Princeton University" (Princeton University, no date, ca. late 1950; file "Aeronautical Engineering" [PUA].

[45] Sayre to Dodds, September 1, 1950; file "Aeronautical Engineering" [PUA].

[46] Condit, Sayre, and Astronomy Department head Henry Russell, to Dodds; July 29, 1943; file "School of Engineering" [PUA].

[47] Sayre to Dodds, September 1, 1950; file "Aeronautical Engineering" [PUA]. The President's response to Sayre's request declared that Dodds was "very happy to endorse without reservation [this] program of development" and commended the aeronautical engineering department on its "quality and service", but without explicitly making any immediate commitment of either building funds or endowment money. Dodds to Sayre, September 21, 1950; file "Aeronautical Engineering" [PUA].

[48] Sayre to Dodds, November 6, 1950; file "Aeronautical Engineering" [PUA].

[49] *Ibid.*

[50] *Ibid.*

[51] *Ibid.*

[52] Sayre to Dodds, November 20, 1950; file "Aeronautical Engineering" [PUA].

[53] Sayre to Dodds, December 14, 1940; file "Aeronautical Engineering" [PUA].

[54] Woodrow to Dodds, November 20, 1950; file "Forrestal Center" [PUA].

[55] "Scientists Move Into Forrestal," *New York Herald Tribune*, May 28, 1951.

[56] Dodds to Princeton faculty, administrators and officers of alumni organizations, January 8, 1951; file "Forrestal Center" [PUA].

[57] "Dr. Dodds Says Center Meets New Needs for Isolation of Research," *Princeton Herald*, May 21, 1952; and "The James Forrestal Research Center," *Princeton Alumni Weekly*, January 19, 1951, 11.

[58] "Scientists Move Into Forrestal."

[59] "Jersey Gains in Jet Study," *The Newark Evening News*, January 9, 1951.

[60] "Scientists Move into Forrestal."

[61] "Princeton Buys an 800-Acre Tract for Forrestal Jet Research Center," *The New York Times*, January 9, 1951; 22:5.

[62] Woodrow to the Chief of Naval Research, Department of the Navy, May 8, 1951; file "Forrestal Center" [PUA].

[63] After Princeton began classified research, those Corporate Associate representatives with proper clearance were offered access to reports on secret work. J. A. Farrington, Jr., to Sayre, November 26, 1952; file "Forrestal Center" [PUA].

[64] "A Memorandum to Corporations from the Forrestal Memorial Committee," September 20, 1951; file "Forrestal" [PUA].

[65] "Aeronautical Science and Engineering at the James Forrestal Research Center," November 2, 1951; file "Forrestal" [PUA].

[66] Frederick Rentschler to George Brakeley, December 7, 1951; file "Forrestal" [PUA].

[67] Brakeley to Rentschler, December 13, 1951; file "Forrestal" [PUA].

[68] "The James Forrestal Research Center: A Memorandum to Corporations," April 1952; file "Forrestal Center" [PUA]. In January 1953, more than sixty scientists attended Princeton's first Corporation Associates Conference, dealing with "Fast Reactions and Combustion Processes." The conference featured a special tour of the Forrestal laboratories and talks by Princeton faculty members, who described their research on jet propulsion, chemical kinetics, combustion, and Project Squid. Program, "First Corporation Associates Conference," January 16 and 17, 1953; file "Forrestal Center" [PUA].

[69] Sloan to Rockefeller, July 1, 1952; file "Forrestal" [PUA].

[70] *Ibid.* Sloan did indicate to Rockefeller that his foundation might consider providing Forrestal with a small project grant of about $10,000.

[71] Sayre, "Notes Following a Study of the Sloan Memorandum," (Princeton University, no date, ca. July-August 1952); file "Forrestal" [PUA].

[72] *Ibid.*

[73] *Ibid.*

[74] Woodrow, "Proposal for a Program in the High Performance Sciences at the James Forrestal Research Center," July 31, 1952; file "Forrestal" [PUA]. See also Daniel Sayre, "The James Forrestal Research Center," *Army Information Digest* v. 7, no. 8; August 1952, 3-10.

[75] "President's Report, 1951-52, Aeronautical Engineering Department" (Princeton University, 1952), 1-2 [PUA].

[76] "Department of Aeronautical Engineering, Report to the President, 1953-54" (Princeton University, 1954), 5 [PUA].

[77] Dodds to D. R. Hamilton, February 1, 1951, file "Physics Department" [PUA].

[78] Hamilton to Dodds, February 20, 1951, file "Physics Department" [PUA].

[79] *Ibid.*

[80] Dodds to Hamilton, February 23, 1951; file "Physics Department" [PUA].

[81] Dodds to Hamilton, February 15, 1951; file "Physics Department" [PUA].

[82] Bowen has commented, "the distinction of many of the key faculty members of that time, and their human qualities, made a big difference. Harry Smyth ... was [not only] a great scientist [but] also ... one of the few people who really defended Oppenheimer during all the times of trouble,... who simply would not yield on his principles .... [T]he fact that it was a person like Smyth, with those principles, who was in the center of all this [debate over classified research] was very reassuring to a lot of people." William Bowen, interview with Amy Bix, November 20, 1991; transcript, 2-3.

[83] Wheeler to Furry, April 6, 1951; file "Physics Department" [PUA].

[84] "Physics Department, Report to the President, 1950-51" (Princeton University, 1951), 9 [PUA].

[85] "Committee on Project Research and Inventions, Report for 1952-53" (Princeton University, 1953), 3 [PUA].

[86] For an excellent account of the development of Spitzer's ideas for containing thermonuclear reactions, see Robin Herman, *Fusion: The Search for Endless Energy* (Cambridge, N.Y.: Cambridge University Press, 1990), 16-32.

[87] Elgin to Woodrow, January 7, 1952; file "Physics Department" [PUA].

[88] *Ibid.*

[89] "Report to the President, Committee on Project Research and Inventions, 1950-51" (Princeton University, 1951), 2 [PUA].

[90] "Physics Department, Report to the President, 1950-51" (Princeton University, 1951), 10 [PUA].

[91] "Physics Department, Report to the President, 1950-51" (Princeton University, 1951), 9-10 [PUA].

[92] "Physics Department, Report to the President, 1951-52" (Princeton University, 1952), 7 [PUA].

[93] "Physics Department, Report to the President, 1951-52" (Princeton University, 1952), 4-5 [PUA].

[94] "Physics Department, Report to the President, 1957-58" (Princeton University, 1958), 12 [PUA].

[95] "Princeton University, Report for 1956-1957 of the Committee on Project Research and Inventions" (Princeton University, 1957), 2-4 [PUA]. The machine was jointly operated by Princeton and the University of Pennsylvania. By its completion, the total cost of the Accelerator had soared to $11.7 million. "Annual Report of the University Research Board and the Office of Research Administration for 1960-61" (Princeton University, 1961), 5 [PUA].

[96] "Physics Department, Report to the President, 1957-58" (Princeton University, 1958), 1 [PUA].

[97] "The Synchrotron: Giant Tool for Basic Research," *Princeton Alumni Weekly*, April 18, 1958, 9.

[98] In previous years, Princeton researchers had constructed several smaller models of the stellarator design, and early results seemed promising. The name "Stellarator" had supposedly been derived by combining the words "stellar" and "generator," as a reference to the power of nuclear fusion. The objective of the machine was to use magnetic fields to confine plasma in a large tube, so that when heated with electrical currents, the ionized gas particles would collide and undergo fusion. "Sherwood Brochure: Fusion Research at Princeton," ca. 1958; file "Forrestal Center" [PUA]. Joan Bromberg gives a detailed account of the development of the Model C, exploring the relation of the Princeton program to research at other laboratories and Princeton's interactions with the AEC. Joan Bromberg, *Fusion: Science, Politics, and the Invention of a New Energy Source* (Cambridge, Mass.: The MIT Press, 1982), 60-65.

[99] "University News," *Princeton Alumni Weekly*, April 19, 1957, 9.

[100] "Princeton University, Report for 1957-1958 of the Committee on Project Research and Inventions and of the Matterhorn Review Committee" (Princeton University, 1958), 11 [PUA].

[101] In that year, just over half the sponsored research contracts, $1,061,000, went to the propulsion laboratory, followed by the gas dynamics laboratory with $550,000. Programs in low-speed aerodynamics, flight simulation, flight mechanics, and instrumentation and control all accounted for $100,000 to $180,000 in sponsored research. "Annual Report to the President from the School of Engineering, 1961-62" (Princeton University, 1962), 9 [PUA]; and "Annual Report to the President from the School of Engineering, 1962-63" (Princeton University, 1963), 11 [PUA].

[102] The aeronautical engineering department's work on jet propulsion and on combustion proved especially important in attracting outside sponsorship. "Report to the President, Aeronautical Engineering, 1955-56" (Princeton University, 1956), 9-10 [PUA]; and "Report to the President, Aeronautical Engineering, 1957-58" (Princeton University, 58), 11 [PUA].

[103] "Annual Report of the University Research Board and the Office of Research Administration for 1960-61" (Princeton University, 1961), 1 [PUA].

[104] "The James Forrestal Center, Princeton University" (September, 1957), 4; file "Forrestal" [PUA].

[105] "Physics Department, Report to the President, 1954-55" (Princeton University, 1955), 1 [PUA].

[106] *Ibid.*, 17-21.

[107] "Physics Department, Report to the President, 1952-53" (Princeton University, 1953), 5 [PUA].

[108] *Princeton Alumni Weekly*, March 11, 1955, 7.

[109] "Matterhorn Review Committee Minutes, 52nd meeting" (Princeton University, March 9, 1959); file "Matterhorn Review Committee" [PUA].

[110] "Matterhorn Review Committee Minutes, 59th meeting" (Princeton University, October 19, 1959); file "Matterhorn Review Committee" [PUA].

[111] "Annual Report of the Plasma Physics Laboratory for 1963-64" (Princeton University, 1964), 3 [PUA].

[112] "Annual Report to the President from the School of Engineering, 1961-62" (Princeton University, 1962), 8 [PUA].

[113] *Ibid.*

[114] "Matterhorn Review Committee Minutes, 9th meeting" (Princeton University, January 18, 1956); file "Matterhorn Review Committee" [PUA].

[115] "Matterhorn Review Committee Minutes, 66th meeting" (Princeton University, September 28, 1960); file "Matterhorn Review Committee" [PUA].

[116] "Matterhorn Review Committee Minutes, 68th meeting" (Princeton University, November 28, 1960); file "Matterhorn Review Committee" [PUA].

[117] "The James Forrestal Campus, Report for 1965-66" (Princeton University, 1966), 1 [PUA].

[118] "Forrestal Center Committee minutes" (Princeton University, meeting of September 12, 1952); file "Forrestal" [PUA].

[119] Sayre to the Forrestal Administrative Committee (Princeton University, May 6, 1953); file "Forrestal" [PUA].

[120] "Report to the President, Aeronautical Engineering Department" (Princeton University, 1956), 7 [PUA].

[121] J. Douglas Brown, "What Makes a Social Scientist," *Princeton Alumni Weekly*, February 22, 1952, 9.

[122] Roger Geiger has described the role of foundations in supporting academic social science work especially in international relations, behavioral research and sociology. Geiger, *Research and Relevant Knowledge*, 94-110.

[123] Harold W. Dodds, "To Teach Wisdom," *Princeton Alumni Weekly*, May 9, 1952, 9.

[124] Harold W. Dodds, "The Council of the Humanities—Its Purpose and Significance," *Princeton Alumni Weekly*, February 20, 1953, 9.

[125] "Alumni View Major Research Projects," *Princeton Alumni Weekly*, October 17, 1947, 8.

[126] "Physics Department, Report to the President, 1952-53" (Princeton University, 1953), 5-6 [PUA].

[127] Lewis L. Strauss, speech to the National Security Industrial Association, September 30, 1953; file "Forrestal Center" [PUA].

[128] "Matterhorn Review Committee, Minutes of the 10th meeting" (Princeton University, February 22, 1956); file "Matterhorn Review Committee" [PUA].

[129] "Report to the President, The Board of Scientific and Engineering Research, 1955-1956" (Princeton University, 1956), 2-3 [PUA]. Over the following years, the number of "Project Research Staff" employed on Matterhorn work averaged about eighty or ninety.

[130] "Annual Report of the Plasma Physics Laboratory for 1963-64" (Princeton University, 1964), 4 [PUA].

[131] "Annual Report of the University Research Board and the Office of Research Administration for 1963-1964" (Princeton University, 1964), 2 [PUA].

[132] "Annual Report of the Plasma Physics Laboratory for 1963-64" (Princeton University, 1964), 1 [PUA].

[133] The AFL-CIO eventually retreated, withdrawing the election petition it had submitted to the National Labor Relations Board. Princeton's Personnel Office attributed the union's decision to back down to the university's "unequivocal stand" that the NLRB had no clear jurisdiction in the case, as well as to a waning of support for unionization after Princeton addressed some of the staff's grievances over payment. "The James Forrestal Research Center, Report for 1959-1960" (Princeton University, 1960), 8 [PUA].

[134] "Report to the President, Department of Aeronautical Engineering, 1962-63" (Princeton University, 1963), 4-7 [PUA].

[135] "Report to the President, Department of Chemistry, 1954-1955" (Princeton University, 1955), 3 [PUA].

[136] *Ibid.*

[137] *Ibid.*

[138] Smyth served as the first chairman of the University Research Board, and the first six faculty members named to the board were the chairmen of the chemistry, biology, and history departments; the dean of the Engineering School, and professors of economics and literature. "New University Research Board," *Princeton Alumni Weekly*, June 5, 1959, 18.

[139] "Committee on Project Research and Inventions, Report for 1952-1953" (Princeton University, 1953), 1 [PUA].

[140] Henry D. Smyth, "Sponsored Research," 7.

[141] *Ibid.*, 10.

[142] "Sponsored Research and Federal Support," *Princeton Alumni Weekly*, March 2, 1965, 9.

[143] *Ibid.*, 15.

[144] William Bowen, interview with Amy Bix, November 20, 1991; transcript, 1.

[145] William Bowen, *The Federal Government and Princeton University* (Princeton, N.J.: Princeton University, 1962).

[146] *Ibid.*, 106-107.

[147] *Ibid.*, 35, 103-105, 114-115.

[148] *Ibid.*, 93.

[149] *Ibid.*, 192.

[150] In 1959-1960, about 20 percent of Princeton graduate students held government-financed fellowships or research assistantships. *Ibid.*, 188-192.

[151] *Ibid.*, 122.

[152] *Ibid.*, 133.

[153] *Ibid.*, 136.

[154] *Ibid.*, 210-211.

[155] *Ibid.*, 191, 196, 200-204.

[156] *Ibid.*, 278-279.

[157] *Ibid.*, 307.

[158] Leslie, "Playing the Education Game to Win."

[159] Galison, 79.

[160] William Bowen, *The Federal Government and Princeton University*, 294-298.

[161] William Bowen, interview with Amy Bix, November 20, 1991; transcript, 1.

[162] *Ibid.*, 1-2.

[163] Robert F. Goheen, "The Student's Responsibility to the University," *Princeton Alumni Weekly*, June 8, 1965, 16-17.

[164] *Ibid.*, 2-3.

[165] "Princeton's Jet Propulsion School Pushes its Research Beneath Ivy," *New York Times*, June 14, 1951.

[166] Geiger, *Research and Relevant Knowledge*, 58.

AMERICAN UNIVERSITIES AND THE INCLUSION OF PROFESSIOANL SCHOOLS

HUGH HAWKINS

It would be verging on mythology to describe a time in the United States when apprenticeship alone was judged adequate for the practice of a profession. There has always been an understanding that acquaintance with formalized learning is also necessary. Recalling his own preparation for a legal career, Lincoln advised a younger aspirant "to get books and read and study them carefully."[1] In fact, "reading law" was the common name for apprenticeship in a lawyer's office at that time. And there has long been an understanding that a professional should not be self-declared. Some group, some association of mature practitioners, such as the district bar, historically has given formal admission. But in the past, was not considered the same as an academic degree awarded by an educational institution. Only gradually over the last 150 years has that credential come to seem requisite for professional status.

The matter of defining a profession has lost some of the urgency of twenty years ago. We need not be quite as cavalier as the title of one of Laurence Veysey's acerbic reviews: "Who's a Professional? Who Cares?"[2] But as Charles Rosenberg warned some years ago, sociological taxonomy can divert historians from significant questions of process.[3] In addressing the question of inclusion of professional schools in universities, it matters less how university leaders defined "profession" than how they defended whatever it was within the university that they labelled "professional school."

Without claiming that university presidents were alone in facing the question, I have turned primarily to them to see how they made the case for professional schools within universities. Their formal pronouncements do not reveal the whole of their motives, of course. But I think it worth exploring three virtues that they repeatedly ascribed to university professional schools.

First, the professional school would rely on an expanding base of systematic knowledge, grounded in theory. Louis Galambos with light satire calls this fund of knowledge the profession's "mystery." The university presidents spoke rather of "science." That term was attached to the learning offered at virtually all university professional schools, including theological. In response to advocates of separated professional schools, the presidents could contend that without the wealth of universities, without their libraries, laboratories, and advanced pursuit of the disciplines, "science" would be extremely difficult to provide.[4]

If it is uncomfortable to settle on the label "science" for the knowledge-base of everything from engineering schools to schools of journalism, it is even harder to find a satisfactory short label for a second major claim in the case for inclusion. Let me approach it indirectly. In this view, the good professional school would treat the profession in broad social, intellectual, and moral context. The practitioner educated in such a school would be more than a technically equipped provider of requested services, more than a participant in the market. The practitioner would draw on an education that instilled such qualities as self-knowledge, ability to take the long view, and reflective consideration of the nature of the good. This description sounds familiar, of course: It resembles persistent defenses of liberal education. The product of such an education, praised endlessly at convocations, bears a striking resemblance to the ideal graduate of a university professional school. I have settled on the term "contextuality" to stand for this capacity. It allowed one to bear in mind values reaching beyond immediate performance of a professional activity and included ability to understand the situation of the client with generous sympathy. Without contextuality, the professional could slip into a narrow concentration on technique, accompanied by exploitation of clients for psychological or economic gain.

However obvious the third characteristic, namely, effectiveness in professional practice, it is still worth our attention. University presidents were careful to mention it. When university-trained, ministers would meet spiritual needs, lawyers keep clients out of jail, and engineers build bridges guaranteed not to collapse. The claim went beyond mere adequacy. The university-trained professional would be deft, would be, in a word later hopelessly cheapened, efficient. Critics observed that such effectiveness might be readily claimed for a free-standing professional school, or even the learning-by-doing of traditional apprenticeship. University leaders countered that practical training in their schools came under skilled and careful guidance from professors supported by salaries, not client fees. That approach was declared superior to the old apprentice system, which lent itself to neglect by the master and risk to the client. Advanced admission and degree requirements also allegedly heightened the likelihood that a university-educated professional would excel in practice, although in theory (and at Andover Theological Seminary in practice) an independent professional school could adopt standards equal to those at leading universities.

Each of these virtues was dangerous if carried to an extreme. Science might paralyze through an over-abstraction that distanced the knower from the immediacy of human needs. The contextualist might be a dilettante, culturally pretentious and shallow. Efficiency could entail a concentration on technique that led to crude instrumentalism. A professional school in a university was peculiarly well fitted to bring the three qualities into a healthy balance, or so the argument went.

University professional schools were more than educators of estimable practitioners. They developed other roles that also allowed expression of these three values. They became, to put it briefly, both creators of new knowledge and repositories accessible to practitioners; centers of criticism, playing the role of professional conscience; direct participants in professional practice through allied institutions, hospitals most notably, but also university churches, agricultural demonstration projects, and laboratory schools; and contributors to the framing of social policy through consultation and contract research. All of these might blur in platitudes about "service," but in their specifics these developments brought the institution, not just its graduates, into the arena of professional activity.

Beyond such service and beyond the virtues to be instilled in graduates of a university-based professional school, there were of course good practical arguments for inclusion. It gave the university prestige, brought in endowment and tuition fees, and encouraged better administration and economies of scale. Through professional schools the university could gain influential alumni. Such reasoning, if considered too calculating for the rostrum, still figured in the inner counsels of university decision-makers.[5]

This mix of claimed benefits appears in one of the fullest records of university development of professional schools, that of Harvard. Although Charles W. Eliot's arrival as president in 1869 is most often identified with the emergence of the elective system, Harvard was already moving in that direction under his predecessor. Eliot was more revolutionary in his prescription to enliven Harvard's somnolent professional schools. A year earlier, while he was teaching chemistry at MIT, Eliot had written of the declining standards of professions. State licensing was so ineffectual, and training requirements so minimal, he remarked, that the very term "learned profession" was beginning to have a "sarcastic flavor."[6] Another leading candidate for the presidency, by contrast, considered Harvard's professional schools in good condition, and the members of the Corporation gave them little attention.[7]

The American university, Eliot predicted, would grow out of American soil, adapted to the ambitions of "the better educated classes," and those ambitions increasingly aimed at professional careers. For him a university was primarily a teaching institution in which no subject of human inquiry taught at an advanced level was out of place. "In a university all the learned and scientific professions may be prepared for." But this inaugural made clear that the central place went to liberal education. He distinguished between liberal and "professional or utilitarian studies," and insisted that a university was not closely concerned with application "until its general education branches into professional."[8]

The divinity school provided an interesting variant. It had been overshadowed by the independent Andover Theological Seminary, formed in 1808 in reaction to Harvard's Unitarianism. The Harvard school's requirement for admission, originally graduation from a reputable college, had eroded after 1840. In 1868, the school had absorbed the Boston School for the Ministry, a popular blend of Unitarianism and evangelism, agreeing at the same time to introduce a two-track system. Students with only high school preparation could now attend Harvard Divinity School and, as an alternative to the B.D., could after as little as one year receive certificates of attendance and call themselves graduates. Here was the Jacksonian pattern of alternate routes into a profession, some academically quite modest. This might be all well and good for ambitious young men who felt the call to preach, but to Eliot this compromise cast doubt on Harvard's worth as a university and helped perpetuate the scandal of unlearned persons in allegedly learned professions. The divinity school gradually resumed the requirement of the baccalaureate for admission.[9]

But entrance requirements were only one of Eliot's concerns. He opposed the merry-go-round professional programs in which no course was prerequisite to any other, with no special attention paid to first-year students. He also attacked degree standards, as little as two terms of course attendance in medicine and three in law. The medical school required a concluding brief oral examination, law not even that.[10]

To alter this situation, Eliot began to call and to preside over faculty meetings in the professional schools. To a resistant medical professor's query of how it could be that, after the medical faculty had managed its own affairs well for eighty years, "now, within *three or four months*, it is proposed to change all our modes of carrying on the School," Eliot responded, "I can answer Dr. Bigelow's question very easily: there is a new President." The tale comes from a letter of Oliver Wendell Holmes, Sr., written at the time. First published in 1894, it lives in academic oral mythology, suggesting how radical Eliot's vision of the university professional schools seemed to those on the scene. But it will not do to exaggerate Eliot's personification of these reforms. Since its creation in 1847, the American Medical Association had vainly urged similar measures.[11]

The changes in the medical school were astonishing. Within three years it came to include a graded curriculum, written examinations, faculty on salary rather than paid by student fees, and clinical work supervised within the school. Law, like medicine, instituted a longer and sequential course, and law and divinity began to base degrees on examinations.

Increasingly Eliot spoke of "scientific professions." Despite wide variation among the subjects pursued by the different professional schools, he insisted, their spirit was the same: "the spirit of modern science—candid, fearless, truth-seeking." Law belonged under the scientific rubric, or so an increasing number of law school catalogs indicated. "If law be not a science," Harvard's Dean C. C. Langdell said, "... it is a species of handicraft, and may best be learned by serving an apprenticeship to one who practices." This statement could seem reasonable only with a very broad definition of science. Harvard's widely imitated "case system," applying the Socratic method to appeals-court decisions, taught students, its advocates claimed, "how to reason like lawyers." Perhaps this fit the loose sense of science used to define the specialness of professional schools. Later, however, it would be attacked as a narrow schoolman's approach, falling short of the university's claim to prepare for effective practice. The appointment as professor of law of James Barr Ames, a legal scholar who had not practiced law, stirred controversy, but seemed to Eliot splendid evidence of the liberation of a university professional school from short-sighted empiricism.[12]

With his genius for organizational structure, Eliot doubtless foresaw the replicability of the new arrangements in future Harvard professional schools. Requirement of a bachelor's degree for entrance, employment of full-time faculty with allegiance to research, and second-tier degrees based on demanding curricula—these set a pattern that the university could apply to any profession. If one believed in science, contextuality, and effectiveness, as Eliot surely did, then the benefits to society of professionalizing another occupation were patent. The Graduate School of Applied Sciences and the Graduate School of Business Administration followed the pattern late in Eliot's administration. (There were failures, too. No clientele appeared to justify Harvard's efforts to sustain schools of mining, agriculture, or veterinary medicine.)

Higher entrance requirements supported Eliot's claim that graduates of Harvard's professional schools had time to absorb the humane values of a liberal education. The lengthened period of professional training allowed Eliot confidently to maintain that both science and effectiveness in practice could be developed in the professional courses. Students could learn both the principles that underlay the field and the skills demanded for its practice. Although it was far from his ultimate expectations for them, he wanted Harvard law school graduates to be able to "earn a living immediately."[13]

Eliot considered it inevitable and useful that there would continue to be professional schools that were independent of universities and that did not demand much prior education. But universities would train the elite. The professions were coming to control the country, he declared in 1902, and for the good of the country and to assure their own institutional influence, universities should make sure they were the source of professional leaders. Harvard graduates, he had said in his inaugural, were properly considered part of an aristocracy—not "a stupid and pretentious caste, founded on wealth, and birth," but rather one that sacrificed self for the public good and "carries off the honors and prizes of the learned professions." All professionals were not part of this aristocracy. One entered through the gateway of collegiate culture.[14]

Like Eliot, Daniel Coit Gilman exalted the college even as he created a university structure above it. He did probably more than any one else in his generation to differentiate the university from the college, all the while extolling liberal education. Even before his assumption of its presidency in 1875 he knew that Johns Hopkins University was to have a medical school. The founder's will had made that clear. But it is surprising how little use he made of this promise of a professional school in defining and defending the new university.

Although Gilman invoked the immense social advantages to follow from a medical school as part of the university, his public statements laid far more emphasis on the medical school's having well-prepared students, a faculty not dependent on student fees, and a dedication to research. To Baltimoreans who claimed to know what Mr. Hopkins had intended and who complained about lack of benefits to the community, Gilman in 1885 made the case for utility through a survey of the departments found within the faculty of philosophy, explicitly avoiding questions about "professional and technical education." He did include a paean to future medical advance, but grounded it in praise for the science of biology, ranking "laboratories in which are studied the laws of life" as more important than hospitals.[15]

For Gilman, a university was distinguished above all else by the advanced level of its teaching. The professors who did such teaching should be dedicated to creating as well as imparting knowledge. In fact, although well aware of the role of learned academies, Gilman declared the university "the best organization for the advancement of science." The faculty of philosophy he declared to be "fundamental," and with it, accordingly, the university would begin. But the German pattern of four faculties was clearly in his mind in 1876, when he announced that a medical faculty would come next, and jurisprudence later. Theology, he said, was not contemplated.[16]

Gilman took pains to distinguish universities from technical schools, which were characterized—as he put it—by "the idea of preparation for a specific calling, rather than the notion of a liberal culture." On the other hand, Gilman's inaugural in 1876 raised the possibility that many "modern callings" could be provided for in the university, a matter he had recently found under discussion in Britain and Germany. He spoke of municipal engineering and architecture as fields into which the new university might move, but with care to keep its schools liberal rather than technical. The university missed its aim if it produced "pretentious practitioners" or "learned pedants." Practitioners needed grounding in scientific theory, and erudition should be imbued with humane culture to give it connection and insight.[17]

An official university publication of 1877 differentiated study in the faculty of philosophy, where the Ph.D. was pursued, as advanced but "not professional." It is still common to distinguish the "graduate school" from the "professional school," despite the general understanding that both prepare for professional careers and both promote research. The ethos of graduate work in arts and sciences is still strongly tinctured by the ideal of seeking knowledge without concern for application. Without exaggerating the importance given this distinction, it does suggest the pains Hopkins leaders took to set research apart as a motive worthy in its own right, independent of application. It is striking, however, how much the research ideal entered into the Hopkins professional schools. The first member of the medical faculty was Henry Newell Martin, a physiologist. After William Henry Welch was appointed in pathology, his chief activity was investigation in his own laboratory, ten years before the medical school opened. In the case of engineering, although it was not a postgraduate program, the rationale for expansion in 1925 stressed advanced training and research, "to take advantage of an atmosphere present nowhere else in America" in order "to train men in engineering research as they are not trained anywhere in America to-day."[18]

In his address at the opening of the hospital, Gilman sought to mediate between claims for scientific advance and practical claims for the relief of suffering. He envisioned the future medical school as an arch resting on and linking two pillars, the university and the hospital.[19] Much of the specialness of the Johns Hopkins medical faculty resulted from its allegiance to the research ideal, but that ideal did not foreclose claims of humane contextuality, as suggested by collegiate preparation, or effectiveness in practice, indicated by the establishment of the hospital and clinical training.

The emergence of complex universities in the United States is nicely punctuated by the formation of the Association of American Universities in 1900. The fact that fourteen of them felt they had enough in common to unite under a constitution suggested the maturing of a new institutional form, as did their shared concern over their reputation abroad. The original call spoke of protecting "the dignity of our Doctor's degrees" from European underestimation, with the Ph.D. mentioned specifically. The research degree seemed to that generation the touchstone for a university.[20]

It was not so clear where the professional schools fit in. The most that could be demanded, when the AAU formally decided in 1908 what minimum made a university eligible for membership, was that in addition to the Ph.D. program, a university should include a professional school requiring at least a year of college for entrance and at least five years of postsecondary education for the professional degree. (The most likely combinations were a three-year law school requiring two years of college or a four-year medical school requiring one year of college.) The group had to bend even this rule in order to admit the University of Illinois that year. The baccalaureate requirement for admission to professional school, though it existed for medicine at Johns Hopkins, was highly exceptional. Harvard's medical school, after adopting that standard in 1901, dropped it again for a time just as Eliot left office, and both Gilman and Eliot headed universities that included undergraduate schools of engineering.[21]

It would be misleading to equate allegiance to contextuality with baccalaureate requirements for professional school admission. Sometimes that allegiance took the form of breadth requirements for students in undergraduate professional programs. Eliot and Gilman's early statements were purposely vague about just how much general education or broadening culture should be attained before entering law or medical school.[22] And the motives, even for the baccalaureate requirement, were not always those of contextuality. They sometimes included development of skills needed in professional study. Gilman put it that way in a 1905 recollection about the demanding entrance standards of the Hopkins medical school.[23]

Presenting college studies as the sole source of contextuality would falsely suggest that no such enlargement can occur within the professional school. During the last thirty years there have been increasing indications that professional education can help students see their vocation in social context. Ethics courses and others in humanities and social sciences, and the social complexities encountered in clinical work—all these are potentially liberalizing. The chief justice of Indiana charged in the 1970s that law school "social awareness" courses were squeezing out practical ones. But ironically, the very clinical training that was originally justified as advancing students' social consciousness has become also the preferred solution to complaints about lack of legal skills. In making the case that law school can provide liberal education, a University of Michigan dean has pointed to virtues he finds available through advanced specialized training, notably the ability "to avoid common hazards to clear thought, such hazards as self-interest, provincialism of time and place, sentimentality, the inability to tolerate uncertainty, and overdependence on familiar categories of thought."[24]

Aspiring universities gradually moved toward requiring full baccalaureate preparation for their most esteemed professional schools (notably for law schools in the 1930s) and lengthening their degree programs, even while retaining some undergraduate professional programs. Schools that kept lower standards in law, for example, disappeared, or merged with stronger competitors, or continued to turn out graduates forced to accept lower professional status. But neither university presidents in general nor the elite Association of American Universities provided the driving force in these changes. Rather, presidents responded to outside accrediting bodies. Sometimes these were committees of national professional associations; sometimes they were alliances of schools that managed to make admission to their ranks the equivalent of accreditation. Universities could be expelled, as Vanderbilt and the University of Mississippi were from the Association of American Law Schools in 1926. The associations often worked through state legislatures. In some states, for a time, graduates of approved law schools were exempt from the bar examination; later, only law school graduates were allowed to take it.[25]

After helping to start the movement for standards, the presidents ultimately declared their institutions oppressed by it. They began to complain of over-rigid requirements. Under one, a school must have its own full-time dean reporting directly to the president, and under another a school must have its own building. During the 1930s, the pharmacists were thought to be particularly officious and demanding. Social work had two accrediting groups, which sometimes worked at cross purposes. Beginning in the 1930s, presidential associations set up national committees through which they hoped to accredit the accreditors. These ventures brought some simplifications, but could not stop the tide of external demands. These, the presidents protested, continued to hamper legitimate experimentation and variation.[26]

The effort to justify inclusion of professional schools was a concern of most university presidents, not just those whose institutions had colonial collegiate roots or those heading post-Civil War foundations that drew on large-scale philanthropy. Among state universities, the same questions arose, albeit with a different relationship to democratic processes and public financial support. The University of Kansas fell at about the midpoint of state universities in budget and prestige. A series of its chancellors participated in national educational councils and vigorously conveyed their ideas to the people of Kansas.

Unlike Harvard and Hopkins, two founding members of the AAU, the University of Kansas faced immense difficulties in developing its professional schools. Chartered in 1864, its reliance on legislative appropriations in a relatively poor state often frustrated leaders' expectations. No single Kansas chancellor gained the legendary stature of an Eliot or a Gilman, but a succession of voices asserted the benefits of university-based professional schools. Enough was accomplished to win Kansas admission in 1909 as the nineteenth member of the AAU.[27]

The university could not easily live up to the aspirations expressed in its charter, which called for not only liberal arts education but also departments of teacher training, law, medicine, and agriculture. In the 1890s under Chancellor Francis Snow, restructuring brought a more recognizable university form. The professional schools, with their own deans, began to hold separate faculty meetings. Although Snow urged that a broadening liberal education should precede the professional, the programs in law, medicine, pharmacy, engineering, and education were modest in their admission standards.

In 1902 an aptly named new chancellor arrived, Frank Strong, holding a Yale Ph.D. in history, but having also practiced law for a time. Heavily tinged with Progressive reformism, he saw the university duty-bound to help Kansas steer its course amid new social complexity by combatting extreme individualism and stressing social interdependence. The professional schools seemed central to this role. Strong attacked the low admission standards of the law school, claiming that practitioners were ill-prepared unless widely read in literature, history, economics, and science. In spite of a resistant dean, Strong saw the standard rise first to high school graduation, then one year of college, and finally two. Improvements in the medical school sufficed to let the school escape a Flexner death sentence in the famous 1910 report.[28]

Strong's successor, Ernest H. Lindley, presented a highly inclusive view in his 1920 inaugural. Generously open to vocational education, the university should permeate it with the "spirit of the arts and sciences." He called particularly for broader training of those preparing for business, which he had no doubt belonged among the professions. An intense scrutiny of the professional schools as a group took place during Lindley's administration, the work of an early 1930s committee set up by the university-wide Senate. The committee attacked the four-year undergraduate professional schools as narrowly specialized and unable to provide a "broad basis for the interpretation of knowledge or an adequate understanding of the social organization in which the profession must function." Such schools might just as well be wholly separate institutions. The suggested corrective, a two-year university college through which all students should pass, with a common freshman year, failed of adoption. Instead, the senate called on each school to work out the problem of breadth, a compromise that confirmed the university's structure as a loose alliance of separate schools.[29]

It was no surprise when the chancellor who arrived in 1939, Deane W. Malott, declared that professional education belonged in every university. Respect for the values of both science and contextuality underlay his assertion that professional education had "intellectual and ethical content requiring a high order of mental ability." In his view, some occupations did not qualify for inclusion, and he warned against "the urge for unlimited additions."[30]

The first university leaders had hesitated to establish a medical school. One early chancellor colorfully admonished that to attempt a full physician's education in rural Kansas would be to engage in "such charlatanry as seen in the awkward empiricism which fills our cemeteries with the prematurely dead and the foul suspicion of laws broken in premature resurrection." From 1880 to 1900 the university offered only the first year of a medical course.[31]

The legislators feared that a medical school would be vastly expensive, but Chancellor Strong with his university ambitions was—in the words of Clyde Griffin—"eager to have an appendage called a Medical School, whatever its quality." A piece of "egocentric philanthropy" finally forced the regents' and legislators' hands. After delaying as long as the offer allowed, until 1905, they accepted cash and land offered by Dr. Simeon Bell on condition that the medical school be established in Rosedale, near Kansas City, Kansas, far from the geographical or population center of the state. To many Kansans this location indicated indifference to state needs, besides being dangerously close to charity patients from Kansas City, Missouri.[32]

A new hospital in 1924 helped, but the medical school's rush to distinction began when Franklin D. Murphy became dean in 1948. State, federal, and foundation support flowed in, and salaries were increased under the "geographical full-time" plan, which allowed department heads to see private patients whose fees aided the school.[33] New funds promoted not only research, but also continuation programs that encouraged Kansas physicians to remain lifelong learners. The school's allegiance to science was balanced by its efforts to ensure practitioner effectiveness.

Humane empathy also counts among Murphy's ideals for the school. "Technical knowledge is only half the doctor's development," he maintained. Doctors must be citizens first, concerned about the social consequences of scientific advance. Under a program he began, every fourth-year medical student spent time working with a rural general practitioner. When Murphy became chancellor in 1951, he was strategically placed to explain why professional schools and universities needed each other. His inaugural, notable for its warnings against McCarthyism, called on the university to guarantee that students in every field attain not just sound technical knowledge, but broad understanding of the world.[34]

There were of course universities that resisted or only grudgingly accepted the newer standards for professional degrees. Often urban service universities, they kept their schools open as long as possible to students with only high school education, or even less. Temple University announced in 1888 that "no special grade of previous study" was required for admission "as the purpose of the faculty is to assist any ambitious young man." Various urban universities sponsored by the YMCA took similar positions. John J. Sirica, whose judicial talents were critical in exposing the Watergate affair, completed his law study at Georgetown University without ever having attended college. The decline in the number of medical schools from 131 in 1910 to 76 in 1930, traditionally presented as a positive development, has undergone reappraisal. As Kenneth Ludmerer has observed, the disappearance of proprietary schools reduced opportunities to enter medicine for minorities and women, and cut the number of physicians in rural areas and small towns.[35]

The last thirty years have seen the rise of a revisionist interpretation that stresses the power, both economic and psychological, that professional schools impart and protect. Under this construction, the insistence on baccalaureate preparation is mostly a form of entry control for the profession. Liberal arts colleges, though steeped in idealistic rhetoric, benefit materially from their function as a channel to elite status. This hierarchical interpretation has appeared in the works, among others, of Burton J. Bledstein, Magali Sarfatti Larsen, and William R. Johnson. Meanwhile, important reassessments have occurred within professional schools. Their students are increasingly likely to be women and minorities, and (if I may impose my terminology) curricula show deepening concern for contextuality. It is less often assumed that scientific advance should have first place over the goals of client service and social responsibility.[36]

Complaints about "too many doctors" or "too many lawyers" now rouse suspicions of an effort to protect monopoly privilege. Abraham Flexner remains a heroic figure, but criticism of him has intensified. Steven C. Wheatley's recent *The Politics of Philanthropy* judges Flexner's elevation of research as excessive and traces its deleterious effects. The outcome not only severely reduced the number of physicians in the country, but made their training less appropriate for many needs of potential clients.

These reconsiderations have stirred interest in a Carnegie study of legal education issued in 1920, which some hoped would parallel the Flexner report, but which turned out to offer surprising encouragement to proprietary law schools, including night schools, though admitting the need for improvements. The report approved varied admission requirements as giving opportunities to poor and minority students. Its author, Alfred Z. Reed, a Carnegie staff member, refused to make Harvard and the case method models for all legal education, suggesting instead that diversity of training would prepare attorneys who could meet a broad range of community needs. He foresaw a "differentiated bar" with two grades of lawyer. The American Bar Association adopted a much more stringent position, although it did allow for part-time law study. The alternative routes to legal practice have only gradually narrowed.[37]

Issues of access and university prestige bear also on the matter of granting university status to occupations not traditionally considered professions. Initiatives for such additions have come from various sources—associations of practitioners, academic entrepreneurs, or donors with favorite causes. These advocates might be discouraged at one university, but could usually turn to another that was more sympathetic. American institutional pluralism has made it easy for professional schools to proliferate.[38]

At the University of Kansas, the William Allen White School of Journalism emerged after World War II from a department whose origins were linked to the university's own publicity needs. Crucial to its elevation was a foundation created to memorialize the nationally known Emporia editor and supported by publishing, radio, and film companies. The dean of this undergraduate professional school tried to win the B.A. for its students, claiming that its "ideal product" would be "a specialist in applied liberal arts" who would "integrate techniques and knowledge." But the school was allowed to give only the less prestigious B.S. At Columbia University, which by 1913 had ten professional schools, including journalism, Dean Frederick P. Keppel warned that a university could spread itself too thin and suggested arrangements among universities to avoid excessive duplication.[39]

For Abraham Flexner, journalism was no profession and Columbia was one of the worst offenders against university ideals. The field of education seemed to him a dubious candidate for professional school status, and library "science" (a term he put in quotation marks) was quite beyond the pale. But Flexner and other purists have lost out. What Burton R. Clark has called the "loose web" of academic organization has eased relations between universities and aspiring professions. The usage that let undergraduate schools be called "professional" provided convenient ambiguity. Advocates for new programs might start with a major, expand to a school giving a bachelor's degree, and then if the venture thrived, move on to the elite pattern of a postgraduate school. Driving such efforts was the persisting idea that university study is essential for an occupation to rank as a profession. Although independent professional schools continue to exist, their numbers are dwindling and their graduates have the burden of explaining their credentials without the prestige of a university name.[40]

Let me take one last look at the triad of virtues for university professional schools that I have sketched here. Admittedly, these claims can grow stale through formulaic repetition. Realistic observation indicates that much more has gone on in the history of these schools than the advancement of these qualities, including narrow-minded pursuit of personal and institutional aggrandizement. Granting that, it still seems appropriate to recall the ideals of university builders for their new or revived professional schools. These leaders wanted professions to draw on knowledge that was careful, growing, and systematized. They called for humane understanding beyond the confines of professional functions. They maintained that neither of these standards should block development of skills needed in the direct application of learning. These values have served as counterweights for each other, and they continue to offer balance in the periodic redesign of professional schools. Why is it important for universities to include professional schools? The answer is implicit in the pursuit of these three values. Not just to demonstrate utility for the rest of society, but to make connections that enlarge possibilities for the advancement of learning.

NOTES

[1] John J. Duff, *A. Lincoln: Prairie Lawyer* (New York, N.Y.: Bramhall House, 1960), 15-16.

[2] Laurence R. Veysey, in *Reviews in American History* 3 (1975): 419-23.

[3] Charles Rosenberg, "Toward an Ecology of Knowledge: On Discipline, Context, and History," in Alexandra Oleson and John Voss, eds., *The Organization of Knowledge in Modern America, 1860-1920* (Baltimore, Md.: Johns Hopkins University Press, 1979), 442.

[4] Louis Galambos, *America at Middle Age: A New History of the United States in the Twentieth Century* (New York, N.Y.: McGraw-Hill, n.d.), 43; Levering Reynolds, Jr., "The Later Years (1880-1953)," in George Huntston Williams, ed., *The Harvard Divinity School: Its Place in Harvard University and in American Culture* (Boston, Mass.: Beacon Press, 1954), 169.

[5] For insightful treatments of such institutional motives, see William R. Johnson, *Schooled Lawyers: A Study in the Clash of Professional Cultures* (New York: New York University Press, 1978), 16-20, and Christopher Jencks and David Riesman, *The Academic Revolution* (Garden City, N.Y.: Doubleday, 1968), 215.

[6] Charles W. Eliot, "The New Education," *Atlantic Monthly* 23(1868): 215n.

[7] The other candidate was Andrew Preston Peabody, Plummer Professor of Christian Morals and acting president. Henry James, *Charles W. Eliot: President of Harvard University, 1869-1909*, 2 vols. (Boston, Mass.: Houghton Mifflin, 1930), 2: 197; Hugh Hawkins, *Between Harvard and America: The Educational Leadership of Charles W. Eliot* (New York, N.Y.: Oxford University Press, 1972), 45-46.

[8] Hawkins, *Between Harvard and America*, 52-53; Eliot "The Aims of Higher Education," *Educational Reform: Essays and Addresses* (New York, N.Y.: Century Co., 1898), 226 ("learned"); "Inaugural Address as President of Harvard College," *ibid.*, 13 ("utilitarian"), 1 ("branches"). On the increasing appeal of professional careers, see Burton J. Bledstein, *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America* (New York, N.Y.: W. W. Norton, 1976) and Thomas L. Haskell, *The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth Century Crisis of Authority* (Urbana, Ill.: University of Illinois Press, 1977).

[9] David W. Light, "The Development of Professional Schools in America," in Konrad H. Jarausch, ed., *The Transformation of Higher Learning, 1860-1930* ... (Chicago, Ill.: University of Chicago Press, 1983), 348-49; Sydney E. Ahlstrom, "The Middle Period (1840-80)," in Williams, ed., *Harvard Divinity School*, 92-99; James, *Eliot*, 1:270-73.

[10] James, *Eliot* 1: 266-68, 273-76; Arthur E. Sutherland, *The Law at Harvard: A History of Ideas and Men, 1817-1967* (Cambridge, Mass.: Harvard University Press, 1967), 140.

[11] Holmes to J. L. Motley, April 3, 1870, quoted in *Harvard Graduates' Magazine* 5(1896-97): 382; Kenneth M. Ludmerer, *Learning to Heal: The Development of American Medical Education* (New York, N.Y.: Basic Books, 1985), 27-28, 61; Paul Starr, *The Social Transformation of American Medicine* (New York, N.Y.: Basic Books, 1982), 90-91.

[12] "Aims of Higher Education," in *Educational Reform*, 226-27; Robert Stevens, *Law School: Legal Education in America from the 1850s to the 1980s* (Chapel Hill, N.C.: University of North Carolina Press, 1983), 52 (quoting Langdell); Johnson, *Schooled Lawyers*, 102-103, 115-19; Hawkins, *Between Harvard and America*, 204-205, Sutherland, *Law at Harvard*, 184.

[13] Hawkins, *Between Harvard and America*, 206 (quoting Eliot).

[14] Eliot, untitled remarks, *Association of American Universities Journal of Proceedings and Addresses* [hereafter *AAU Proc.*] 4 (1902): 42; Eliot, "Inaugural," *Educational Reform*, 22.

[15] Daniel C. Gilman, "The Utility of Universities: An Anniversary Discourse," *University Problems in the United States* (New York, N.Y.: Century Co., 1898), 75, 58.

[16] "Utility of Universities," *ibid.*, 52; "The Johns Hopkins University in Its Beginnings: An Inaugural Address," *ibid.*, 20.

[17] "Inaugural," *ibid.*, 14, 10, 26-27, 19.

[18] Laurence Veysey, "Higher Education as a Profession: Changes and Continuities" in Nathan O. Hatch, ed., *The Professions in American History* (Notre Dame, Ind.: University of Notre Dame Press, 1988), 26. I have found "non-professional graduate students" separately categorized as late as 1913 at Columbia (Frederick Paul Keppel, *Columbia* [New York, N.Y.:

Oxford University Press, 1914], 276). A. McGehee Harvey et al., *A Model of Its Kind*, 2 vols. (Baltimore, Md.: Johns Hopkins University Press, 1989), I, *A Centennial History of Medicine at Johns Hopkins*, 17-22; "Engineering Education, A Problem and Its Solution: What Johns Hopkins Proposes to Do," *Johns Hopkins Alumni Magazine* 14 (1925): 169. The Institute of Law, which opened in 1928 but was abandoned five years later after fund-raising failed, cared nothing about training lawyers, granted no degrees, and was in fact a research institute (John C. French, *A History of the University Founded by Johns Hopkins* [Baltimore, Md.: Johns Hopkins University Press, 1946], 243-48).

[19] "Knowledge and Charity: An Address on the Relations of a Hospital to Medical Science, Delivered at the Opening of the Johns Hopkins Hospital," *University Problems*, 201, 209.

[20] "A Conference of American Universities on Problems Connected with Graduate Work: The Call," *AAU Proc.* 1(1900): 11; Hugh Hawkins, *Banding Together: The Rise of National Associations in American Higher Education, 1887-1950* (Baltimore, Md.: Johns Hopkins University Press, 1992), 10-15.

[21] "The Ninth Annual Conference," *AAU Proc.* 9 (1908): 10-11; "Report of the Special Committee on Aim and Scope of the Association," *ibid.*, 75; Samuel Eliot Morison, *Three Centuries of Harvard, 1636-1936* (Cambridge, Mass.: Harvard University Press, 1936), 393, 393n; Abraham Flexner, *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching* (New York, N.Y.: Carnegie Foundation for the Advancement of Teaching, Bulletin 4, 1910), 28-29; Ludmerer, *Learning to Heal*, 113. For a revealing comparison of medical and engineering education, see Samuel Haber, "The Professions and Higher Education in America: A Historical View" in Margaret S. Gordon, ed., *Higher Education and the Labor Market* (New York, N.Y.: McGraw-Hill, 1974), 262-70.

[22] In 1878, John Shaw Billings inferred that Gilman did not believe the medical degree need be postbaccalaureate (Harvey et al., *A Model of Its Kind*, I, 15-16).

[23] Gilman, *The Launching of a University and Other Papers: A Sheaf of Remembrances* (New York, N.Y.: Dodd, Mead & Company, 1906), 124.

[24] Stevens, *Law School*, 214-16, 238-43; Terrance Sandalow, "The University and the Aims of Professional Education," in [University of Michigan] *Rackham Reports* (1988-89): 159.

[25] Stevens, *Law School*, 106n33, 195; Maxwell H. Bloomfield, "Law: The Development of a Profession," in Hatch, ed., *Professions in American History*, 43-44; Johnson, *Schooled Lawyers*, 56-57, 145-48. For the power of state medical licensing boards, especially before 1930, see Ludmerer, *Learning to Heal*, 249-54.

[26] Hawkins, *Banding Together*, 92-93, 162, 214-16; William K. Selden, *Accreditation: A Struggle over Standards in Higher Education* (New York, N.Y.: Harper, 1960), *passim*; Roy Lubove, *The Professional Altruist: The Emergence of Social Work as a Career, 1880-1930* (Cambridge, Mass.: Harvard University Press, 1965), 150-52; Harold Orlans, *Private Accreditation and Public Eligibility* (Lexington, Mass.: D. C. Heath, 1975), 17.

[27] William K. Selden, "The Association of American Universities: An Enigma in Higher Education," *Graduate Journal* 8 (1968): 205.

[28] This and the following paragraphs are based on Clifford S. Griffin, *The University of Kansas: A History* (Lawrence, Kans.: University of Kansas Press, 1974). See esp. 170-72, 220-27, 267, 270. See also Clyde Kenneth Hyder, *Snow of Kansas: The Life of Francis Huntington Snow with Extracts from His Journals and Letters* (Lawrence, Kan.: University of Kansas Press, 1953), 196-200; Flexner, *Medical Education in the United States and Canada*, 225-26.

[29] Griffin, *University of Kansas*, 396-400, 399 ("spirit"), 546-54, 552 ("basis").

[30] *Ibid.*, 482.

[31] *Ibid.*, 135.

[32] *Ibid.*, 264-73, 273 ("appendage," "egocentric"). Two local proprietary medical schools were absorbed at the time of the move to Rosedale. Not until 1909 were two years of college required for admission. Another problem was the split between the first two years of the school in Lawrence and the two clinical years in Rosedale. They were united only in 1963.

[33] *Ibid.*, 609.

[34] *Ibid.*, 606-610, 610 ("technical"), 519-21 (inaugural).

[35] Richard Angelo, "The Social Transformation of American Higher Education," in Jarausch, ed., *Transformation of Higher Learning*, 263 ("special"); Ludmerer, *Learning to Heal*, 246-49; John J. Sirica, *To Set the Record Straight: The Break-in, the Tapes, the Conspirators, the Pardon* (New York, N.Y.: Norton, 1979).

[36] Bledstein, *Culture of Professionalism*; Larsen, *The Rise of Professionalism: A Sociological Analysis* (Berkeley, Calif.: University of California Press, 1977); Johnson, *Schooled Lawyers*. For insightful interpretations of recent scholarship on professionalism, see Thomas L. Haskell, "Introduction," and Eliot Freidson, "Are Professions Necessary?" both in Haskell, ed., *The Authority of Experts: Studies in History and Theory* (Bloomington, Ind.: University of Indiana Press, 1984), pp. ix-xxxix, 3-27. For a pre-revisionist survey of university-professional school relations in the late 1950s, see T. R. McConnell, G. Lester Anderson and Pauline Hunter, "The University and Professional Education" in Nelson B. Henry, ed., *Education for the Professions: The Sixty-first Yearbook of the National Society for the Study of Education* (Chicago, Ill.: University of Chicago Press, 1962), 254-78. The article is also of interest for its labelling as "a *multiversity*," the institutional result of proliferating professional schools (p. 255, italics in original), one year before the first use of the term cited in the OED, 2nd ed.

[37] Ellen Condliffe Lagemann, *Private Power for the Public Good: A History of the Carnegie Foundation for the Advancement of Teaching* (Middletown, Conn.: Wesleyan University Press, 1983), 76-83; Michael Schudson, "The Flexner Report and the Reed Report: Notes on the History of Professional Education in the United States," *Social Science Quarterly* 55 (1974): 347-61.

[38] For an example of boosterism for professional schools in general, urging them to assert their common interests, see James E. Cutler, "Professional Education," *Educational Record* 19 (1938): 47-55. Cutler was dean of the School of Applied Social Sciences at Western Reserve University.

[39] Griffin, *University of Kansas*, 278-79, 579-81 (quotation, 580); Keppel, *Columbia*, 244-45, 276.

[40] Abraham Flexner, *Universities: German, English, American* (New York, N.Y.: Oxford University Press, 1930), 29, 172n, 133; Burton R. Clark, *The Higher Education System: Academic Organization in Cross-National Perspective* (Berkeley, Calif.: University of California Press, 1983): 190-91, 78-81; Robert H. Wiebe, *The Search for Order, 1877-1920* (New York, N.Y.: Hill and Wang, 1967), 121.

THE 'GERMAN MODEL' AND THE GRADUATE SCHOOL: THE UNIVERSITY OF MICHIGAN AND THE ORIGIN MYTH OF THE AMERICAN UNIVERSITY

JAMES TURNER AND PAUL BERNARD[1]

The origin of the American university, the graduate school in particular, has a kaleidoscopic quality. The pieces are all familar—the early nineteenth-century colleges with their tiny faculties, small student bodies, and limited curricula; the catalytic example of the great German universities; the take-off of research; emergence of graduate training; professionalization of academic disciplines; expansion of curriculum; growth in numbers and infrastructure. Put these bits together, and there appears Cornell or Chicago or Michigan. But *how* to fit them together? Where, especially, to put the German example, the piece around which others often appear to coalesce?

Something like a standard pattern has taken shape in university history—one not so much wrong as oversimple. It can be briefly summarized.[2] Before the Civil War, American colleges mostly devoted their energies to controlling unruly students, their curricula to rote-learning of classical languages, rhetoric, and simple mathematics. In today's terms, they resembled high schools more than colleges—and certainly not universities, for the best of them aimed only to transmit the existing culture; the expansion of knowledge lay utterly outside their purpose. But the very defects of antebellum colleges provoked reform. Deepening discontent with their intellectual decrepitude inspired efforts to breathe new life into these dry bones; college reform became a persistent issue from the beginning of the nineteenth century.[3] It finally achieved success in the decades after the Civil War.[4]

The key innovations came from a cadre of academics who looked at colleges from a common point of view, deriving from a shared educational experience. Since early in the century, aspiring young Americans had embarked for Germany to pursue studies unavailable in their own country.[5] Returning, they imported more than *Wissenschaft*; they brought back a new idea of higher education. These German-trained professors were at first voices crying in a wilderness. But their influence magnified after mid-century, when leading college presidents went on pilgrimages to study European education, especially the celebrated German universities.[6] These lessons were swiftly applied. From the failed attempts of the 1820s to pull Harvard out of its slumbers to the invention of the modern American university at Cornell and Johns Hopkins in the 1860s and 1870s, it was the example and personal experience of German universities that commonly inspired reformers and shaped their vision.[7]

Americans saw four principal elements in the German model. First, the Germans clearly distinguished preparatory studies, appropriate to the *Gymnasium*, from the higher learning, proper to the university. Second, German universities assumed as their mission the advancement of knowledge (that is, production of and training in original research). Third, the universities gave both professors and students the independence needed to pursue knowledge (*Lehrfreiheit* and *Lernfreiheit*). Fourth, this research ideal took flesh in distinctive institutional arrangements–notably the seminar, to train researchers, and the Ph.D. degree, to certify their competence. American reformers seldom wished to duplicate exactly the German university in the United States, and German influence ultimately had little direct effect on undergraduate colleges. But these four principles shaped advanced studies. More specifically, the German research ideal and the institutions linked with it led directly to that American invention, the graduate school.

No one believes that German influence tells the whole story. For instance, many scholars see professionalization as an independent force driving the move toward research universities.[8] And, as historians have long pointed out, American university reformers borrowed selectively from Germany.[9] For example, *Lehrfreiheit* translated fairly well into the American practice of academic freedom; but *Lernfreiheit*—the German custom by which a qualified student could enroll at any university, in any course[10]—never habilitated itself in the United States. And what Americans did borrow, they reworked. The Ph.D. degree functioned quite differently in the two countries. In American universities, the Ph.D., from the beginning, usually entailed much more substantial research than in Germany. And in America the degree served almost exclusively as gateway into the professoriate, in Germany chiefly as a ticket into the civil service or secondary school teaching.[11] Most strikingly, the Americans concocted a novelty never imagined in Germany: the distinction between undergraduate and graduate studies.

Yet, if German example does not explain everything, it explains a lot. If native social changes fed the deepest roots of the American research university, Germany still provided the "research ideal." If the German university had little to offer the American undergraduate college, it still was the main influence on advanced training. If Americans picked and chose among German practices, they still got from Germany the characteristic concepts and institutions of graduate education. So the story goes, and it is a plausible one.

Yet, on closer reading, the tale begins to unravel. To begin with, by no means every university reformer waxed lyrical over Germany. Indeed, invocations of German example are in some cases peculiarly sparse. President Charles W. Eliot, the architect of modern Harvard, in his inaugural address in 1869 gave one fleeting mention to Germany in almost thirty printed pages (France got more attention). [12]

The story grows still more tattered. German influence accounts clumsily even for the changes it is supposed to explain in American higher education between 1850 and 1900—even in graduate education. There are too many ill-fitting connections, too many outright gaps. Why did the requirements for and uses of the Ph.D. change so drastically in the United States? Why did the seminar, a semi-autonomous institute in Germany, become a one- or two-semester class in America? Where did Americans get the unheard-of notion of distinguishing "undergraduate" from "graduate" schools?

The glaring disparity between Teutonic example and American practice may explain why historians put so much emphasis on Johns Hopkins, the one well-studied American university that demonstrably did try to emulate the Germans.[13]

How often did reformers actually follow German patterns? Perhaps even more to the point, *how* did they follow them?

I.

An adequate reply to that question requires the writing of a very large book. But the starting point is easy to find. It lies in recognition that the German model came in many versions. Different Americans impressed with German education drew differing lessons from its achievements. Their responses varied, less because of ignorance of German practices (as some historians suggest) than because of awareness of American problems.

True, the role of ignorance should never be discounted. Inadequate preparation in the language, brevity of time, the distractions of exotic sights and tastes prevented many American students, possibly most, from knowing well the German universities they attended. Andrew Dickson White seems to have got mostly language practice out of his dilatory term at Berlin, and he was no slouch.[14]

Yet not every Yankee in Göttingen was an innocent abroad, and doltishness goes only so far to explain why each returning scholar recited his own distinctive list of Teutonic virtues and vices. Americans naturally picked out as the salient features of German universities not what a German academic might have chosen, but what rubbed hardest against their own discontents with American higher education. Joseph Cogswell, for instance, was particularly struck by the specialization and diligence of Göttingen's scholars, George Ticknor by the size and currency of its library, John Lothrop Motley by its library–and the absence of dormitories![15] This last impression (which also figured in Henry P. Tappan's specifically Prussian ideal) comes alive when one recalls how much energy antebellum American professors had to pour into merely custodial supervision of the youngsters in their charge. And this peculiarly American reaction makes the point; the motive of reformers was not to emulate Germany, but to improve their own colleges. Thus the origin of the *research university*—Germanic influence and all–only comes into focus when viewed as one outcome of a century-long struggle to redefine the American *college*.

This effort began not long after 1800. From their seventeenth-century beginnings, American colleges had offered an education inherited from the English Renaissance.[16] In early nineteenth-century colleges teaching still centered on Greek and Latin, rhetoric, natural philosophy, and mathematics of a fairly practical sort. This was a training nicely suited to prepare teenage boys for life as seventeenth-century gentlemen or even for further study of theology or medicine in seventeenth-century universities.

Its relevance to nineteenth-century America came increasingly into doubt. The celebrated Yale Report of 1828 defended the classical curriculum as providing "the *discipline* and the *furniture* of the mind."[17] But other studies seemed equally able to discipline the mind, while furnishing it to more modern purposes. Ultimately two new paradigms came to compete for control of the colleges.[18] One (appearing in some institutions as early as the 1820s) stressed modern languages, mathematics, and the sciences and claimed to offer an education somehow useful in a modern commercial and technological world. The other developed more gradually out of the old classical education, often claiming the classical mantle. It continued to emphasize Latin and Greek, adding history, literature, and the fine arts; it prized the formation of character and intellect rather than usefulness and by the 1880s had evolved into what we now call the liberal arts ideal.[19]

The "utilitarian" paradigm moved toward specialization of knowledge. The example of increasingly arcane scientific expertise, of newly insistent professional claims to authority, of greater division of labor in the economy all pulled in this direction. Inside and outside the college, division of *intellectual* labor promised efficiency and progress. Indeed, utilitarian reforms were thought to link the college or university with the "real" world outside it. In this sense they belonged with contemporary innovations like the agricultural experiment station and the teaching hospital; they anticipated such early twentieth-century phenomena as the "Wisconsin Idea" and the industrial research laboratory.

The liberal arts paradigm resisted specialization, insisted on broad grasp and integration of knowledge rather than expertise. It drew strength from the pervasive integrating influence of Scottish Common Sense philosophy in antebellum colleges and, later in the century, from idealist philosophy infiltrating from Germany. The liberal arts movement also gained salience from the Victorian crisis of religious faith, which encouraged the search for new sources of cultural unity and spiritual vision to replace the loosening glue of belief in God. In 1895 Charles Eliot Norton summed up the animus of the liberal arts paradigm: "The highest end of the highest education is not anything which can be directly taught, but is the consummation of all studies. It is the final result of intellectual culture in the development of the breadth, serenity, and solidity of mind, and in the attainment of that complete self-possession which finds expression in character."[20] The analogy with the German *Bildung* ideal appears strong, but in fact advocates of the liberal arts looked more to Matthew Arnold than to Wilhelm von Humboldt.

No one drew neat lines between the utilitarian and liberal arts paradigms. The same college president often urged both ideals in a single speech; advocates of each never hesitated to borrow notions native to the other. These labels identify the two major directions of reform, not two warring camps. If these clusters of ideas rested ultimately on incompatible principles, consistency has never been the hobgoblin of academic minds. The baffled offspring of this mixed marriage still bless our campuses today. But to understand the uses of German example, one must realize that college reformers felt tugged toward these two distinguishable, if seldom clearly distinguished, goals.

II.

Amid this swirl of conflicts over the shape of American higher education, the University of Michigan took form. Michigan's young life powerfully influenced the evolution of the research university—and not merely because it became the largest American university by the 1870s. Henry P. Tappan's much-discussed innovations at Michigan in the 1850s and early 1860s provided the first American model of a modern university. Andrew Dickson White, "perhaps the most significant of the university builders in the United States," spent a decade at Michigan absorbing Tappan's ideas before becoming the first president of Cornell.[21]

Such trailblazing was not much evident in the University's beginnings. At its start Michigan had combined some organizational innovation with a very traditional curriculum. The effective history of the University began with its founding in Ann Arbor in 1837. Lacking any clear American precedent for the role of a state university, the state's constitution-writers turned to the French philosopher Victor Cousin's celebrated 1832 report on Prussian education—the most systematically developed and, thanks in large part to Cousin, the most admired of the German educational systems. Following Cousin, Michigan's lawgivers declared the University the capstone of a unified system of public instruction—a capstone, to be sure, with only dreams under it. The example of the Prussian rectorial system (reinforced possibly by sheer parsimony) also apparently suggested a rotating chancellorship, taken each year in turn by one of the professors.[22]

Prussian influence went no further. The university's internal workings, leaving aside its revolving chancellorship, mimicked faithfully the old-fashioned American collegiate model. Lacking any distinctive idea of what curriculum ought to be, the University's Regents copied the traditional classical pattern. The faculty even adopted the language of the 1828 Yale Report, though insisting that "mental discipline" was more important than "mental furniture."[23]

Tradition did not bring stability. Cramping poverty disfigured the University's first several years, domestic bickering its next few. The state's political leaders soon felt the need for a steadier hand at the helm than a one-year chancellor's; and the new constitution of 1850 mandated a permanent president. The Regents finally hired one in August of 1852.

III.

The man they got—having failed to lure more prominent candidates—was Henry Philip Tappan.[24] A Congregational minister, sometime professor at New York University, writer on philosophic subjects, and great fan of Victor Cousin, Tappan offered as his chief recommendation for the Michigan job that he had recently stamped himself an authority on higher education. In 1851 he published a book called *University Education*, devoted largely to praising the Prussian system *à la Cousin*: "acknowledged to be the most perfect in the world." Indeed, Michigan's half-hearted visions of building a New Berlin in Washtenaw County's green and pleasant land probably helped to persuade this New Yorker to come west.[25]

Tappan wanted "a University worthy of the name," by which he meant a Prussian one. He, like the Michigan constitution, imagined the University as capping a unified state system of public instruction. However, Tappan regarded the existing curriculum at American colleges, including Michigan, as like "that of the Prussian Gymnasia." Ultimately he wanted college work to hive off into the state's secondary schools, which would then assume the current role of American colleges–that is, become Gymnasia. This shift would eliminate the solecism of "a University Faculty giving instruction in a College or Gymnasium."[26]

Tappan realized, however, that for the present the University must continue to give collegiate instruction; so he set as his "first object ... to perfect this gymnasium."[27] To this end Tappan immediately instituted within the Department of Literature, Science, and the Arts "a scientific course parallel to the classical course," with English, history, and additional mathematics displacing Greek and Latin.[28] Tappan stretched the Prussian analogy pretty far here: The Gymnasium was resolutely classical. Yet he felt the appeal of the utilitarian paradigm, especially in a frontier state.[29] There was to his mind nothing auxiliary or second-rate about utilitarian studies at the "Gymnastic" level.[30]

These reforms expanded the German ideal into what Tappan called "the comprehensive idea of a University." Here a student was supposed to find any instruction desired, including schools of agriculture, fine arts, industrial arts, and pedagogy (though, in fact, the student would have looked in vain for these at Tappan's Michigan). This comprehensive ideal would later resurface in the founding of Cornell by Tappan's disciple Andrew Dickson White. It would exercise decisive influence on the structure of American universities, especially state universities. Yet Tappan insisted that such schools could not form part of the University "properly speaking." This august entity by definition comprised only faculties of theology, law, medicine, and philosophy.[31] Rather, adding various sub-university studies simply patched up deficiencies of American colleges, considered in their role as quasi-Gymnasia. And, "after all that can be done to perfect it," the "Undergraduate course" or "Gymnastic department" is "still limited to a certain term of years, and, necessarily, embraces only a limited range of studies."[32]

These limits seemed to Tappan a crippling defect, for "a system of Public Instruction can never be complete without the highest form of education."[33] Tappan was scarcely alone in recognizing the essentially propaedeutic nature of American colleges. Even the 1828 Yale Report declared the purpose of collegiate training "*to lay the foundation of a superior education*."[34] Tappan's distinction lay not in recognizing the need, but in trying to meet it—and in invoking a particular version of the German model to do so. A real university must, like Prussian ones, offer "those more extended studies in science, literature, and the arts, which alone can lead to profound and finished scholarship." Following "Prussian principles of education," Tappan regarded such advanced study, not as an ornament of the University's work, but as "the culmination of the whole."[35]

He proposed, therefore, "to open courses of lectures" in which college graduates and others prepared "by previous study" could pursue "the highest knowledge." He intended this "University Course," as he called it, to "form the proper development of the University, in distinction from the College or Gymnasium now in operation." All this, he assured his readers, was "in accordance with the educational systems of Germany and France." The Course included twenty subjects of study, ranging from "Systematic Philosophy" through "Ethics and Evidences of Christianity," "Chemistry," and "Philology," to "The Arts of Design."[36]

In keeping with its character as true university work, the University Course discarded altogether the method of instruction by class recitation, still then common to all American colleges. Teaching was instead to "be conducted exclusively by lectures." The student would also have "full opportunity" to use "the library and all other means that can aid him in literary cultivation and scientific researches."[37] These "researches" probably did not mean what we now call original research (though that was not excluded) but something closer to looking up information independently, as an undergraduate is now said to "do research" for a term paper. Study in the University Course, unbounded by specified time limits, aimed at the achievement of erudition rather than the fulfillment of requirements. Otherwise, in method and level of teaching, the closest analogy in our present universities is probably to upper-level undergraduate lecture courses.

More to the point, the University Course resembled instruction in German universities. "This Course," Tappan wrote, "when completely furnished with able professors and the material of learning, will correspond to that pursued in the Universities of France and Germany."[38] Despite his pretensions, Tappan was at this date hardly an authority on the "German system."[39] Yet he had learned its broad structure and absorbed his own version of its ideals. Independent learning based on lectures and reading, rather than recitation tested by regular examinations; pursuing the latest knowledge, rather than imbibing traditional learning; concentrating on a few chosen fields, rather than following a standard and rigid curriculum—in all these respects Tappan's program borrowed heavily and self-consciously from the German universities of his day.

Yet Tappan did *not* borrow the elements that loom so large in the received history of German influence and the rise of graduate education. He shied away from narrow specialization, avoiding even the German pattern of examination in one major subject and two minors. He ignored the German Ph.D. degree.[40] Increasingly aware of the prominence of research in German universities, he never incorporated it into the University Course. Far from hostile to research, Tappan urged it on his faculty.[41] But discovery of new knowledge never figured as a substantial *educational* ideal in his programmatic statements. Tappan believed lectures and independent reading entirely adequate to convey the "highest learning" and apparently never mentioned the seminar, already the symbol of erudition in Germany.[42]

The most persuasive explanation for this pattern of selective adaptation is the simplest. Tappan's immersion in the problems of American collegiate education had decisively shaped his understanding and uses of the German university. This is not to deny his genuine and uncolored admiration for German education. But his Prussian enthusiasms inevitably filtered through his concerns about the inadequacies of American colleges—and the filtered remains made up his program for the advanced education of college graduates.

Thus, Tappan's "German" system at Michigan was very much part of the confused struggles to reshape the American college. Like Wayland at Brown, whom he much admired, Tappan had considerable sympathy with the "utilitarian paradigm." He worried, not so much that the old classical course had grown irrelevant, but that its relevance had grown too limited. With the increasing importance and complexity of science and technology, colleges—especially those responsible to the public at large—needed to add such useful training to their curricula. These concerns led Tappan to the "scientific course" in the "Gymnastic department" and, more generally, to his astonishingly broad construction of the Prussian Gymnasium and his refashioning of the Prussian system into a "comprehensive university."

Yet Tappan's deepest educational loyalties lay with the "liberal arts paradigm." This informed both his view of the German model and his "University proper" in Ann Arbor.[43] For Tappan, the culmination of education was the integrative culture that he associated with "the highest learning." Hence he quite naturally placed ideals like independent minds, thirst for knowledge, and breadth of learning at the intellectual core of the German university. (How much Tappan's notions actually owed to Humboldt's *Bildung* ideal is not clear.) And he isolated as the key institutions of the German university those arrangements that appeared to him to support such ideals, such as the lecture system. By the same token, Tappan's preoccupations blinded him to the salience of other features of German universities—including the careerism and narrow specialization that had smothered Humboldt's dream in its cradle.

German influence on Tappan was authentic. The pedagogical structure of the University Course and, to some extent, even the liberal arts ideals underlying it really were borrowed from Germany—but from a Germany itself seen through the lens of the liberal arts paradigm.[44] *Tappan's* Prussian university, just as his University Course, aimed to produce erudition grounded broadly in "truth, knowledge, beauty, and culture."[45]

Yet the University Course was not a direct ancestor of the liberal arts college any more than of the graduate school. It offered education at a much higher level than any mid-nineteenth-century college, in terms of both what it taught and how it taught it. Tappan despaired of the youngsters then entering college mastering such a curriculum. Those who wished *either* the preparatory classical studies of the Gymnasium *or* a simply utilitarian education would find it in college. True liberal education awaited those who had made it through college. Yet, though postgraduate, the University Course was hardly graduate school in the later sense: It lacked both narrow specialization and focus on research training. Although Tappan's University of Michigan was the most celebrated German-model university in mid-century America, it resembled no mature form in the American university. German influence in American higher education followed a more tortuous path than historians have generally allowed.

Tappan's vision of university studies amounted to little more than a pipe dream when he left Ann Arbor. Why he failed is a matter of conjecture: perhaps chiefly for lack of clientele. Michigan did institute several "postgraduate" lecture courses toward the end of his tenure; but who populated them is a mystery, since there were never more than two or three resident graduates in arts and sciences.[46] Still, in proposing to turn college graduates into learned Germans, Tappan began the serpentine movement that eventually led to graduate training at Michigan. In the process, he also stepped on too many toes. The wonder is that he survived for over ten years. In 1863 the Board of Regents, unjustly, foolishly, inevitably, fired him.

IV.

Tappan's successor was Erastus O. Haven, who spent his six years in office scowling at innovation.[47] In his haste to restore the good old days Haven immediately expunged from the catalogue the very Prussian statement on the "Organization of the University" that had appeared throughout Tappan's term; eventually he even dropped the word "undergraduates." Nevertheless, Tappan's University Course had taken on a life of its own, even if a feeble one, as the route by which aspirants to the master's degree prepared for their examinations. On average, about six graduate students seem to have attended each year during the Haven interregnum—actually an increase over the Tappan years.[48]

When Haven resigned in 1869 to become president of Northwestern, it took the regents two years to find a replacement. In the meantime Henry Simmons Frieze, professor of Latin, served as acting president. Frieze had come to Ann Arbor in 1854 and immediately caught Tappan's Germanophilia. The next year he traveled in Europe, apparently attending lectures at Berlin during the winter term. "What he saw with his own eyes more than confirmed his previous impressions of the great excellence of the German gymnasial and university training, and after his return he never ceased to commend the application of German methods" to American schools and universities.[49]

It was therefore no surprise that Frieze revived Tappan's project of turning the state's high schools into Gymnasia. He even looked forward ultimately to replacing the A.B. with a certificate of proficiency, to be granted by the high-schools-become-Gymnasia. This would have amounted to an American version of the Prussian *Abitur*, though apparently minus the standardized examination required of Gymnasium graduates in Prussia.[50] Frieze actually did inaugurate a scheme of admission-by-diploma for graduates of high schools inspected and approved by University of Michigan faculty—eventually including schools as far away as New York and New England.[51] (This idea evolved into the now universal American practice in which high school transcripts replaced the old, widely varying entrance examinations given by every college.) But, outside the University at least, Frieze's ambitions seemed never quite understood. The high schools never became Gymnasia. College studies remained in college.

V.

Serious development of graduate education took place after James B. Angell arrived in Ann Arbor in 1871.[52] Angell held the presidency until 1909. During his first two decades, all the distinguishing marks of today's graduate school appeared at the University: the distinction from both undergraduate education and postgraduate professional studies; the focus on training in original research; the entrenchment of the seminar as the characteristic method of such training; the awarding of the Ph.D. as the research degree; and finally, in 1891-92, the formal organization of the graduate school.

James B. Angell was the chief architect of the modern state university, a giant of the founding era of the research university. But he was almost entirely marginal in the story of graduate education. Unlike Tappan or Frieze, he cherished no broad vision of the future. Though fond of uttering appropriate pieties on public occasions, Angell really operated as promoter, fund-raiser, manager. In exercising these skills extraordinarily well, Angell carved out the niche that university presidents fill today. His diverse interests, humane sympathies, and genius for compromise made him effective and popular. He had a good eye for talent: hired it, nurtured it, gave it a free hand. He often welcomed innovation, usually let others do the innovating—particularly in graduate education, for his heart lay with the college.[53] The graduate school evolved less under Angell's direction than under his benign smile—and under the long shadow of Henry Philip Tappan.

The key players were Henry Frieze and Charles Kendall Adams. Frieze was not only Tappan's most ardent disciple; he also enjoyed a friendship with Angell stretching back over twenty-five years. This longstanding amity, together with his own experience running the university, gave Frieze probably more leverage than any other member of the faculty. After stepping down as acting president in 1871, Frieze embarked on his second European journey, this one of two years' duration. He renewed his admiration for the Germany university during a term at the University of Tübingen "diligently studying Sanskrit under that great scholar, Professor Roth."[54]

The other major actor, Charles K. Adams, imbibed Tappan's ideas direct from the source as a Michigan undergraduate. A second critical influence was the professor of history, Andrew Dickson White. White had arrived in Ann Arbor in 1857, Adams's freshman year, and immediately proved a rousing teacher. He "sent a sort of historical glow through all the veins and arteries of the University," Adams later recalled.[55] White introduced a vaguely German mode of instruction (possibly inspired by his own brief attendance at Berlin), replacing recitations with lectures and encouraging students to read beyond the textbook. His reliance on lectures soon spread to other professors—an enduring and substantial innovation. White also proposed somehow to "exercise" students in "original investigation," though this ambition vanished from the catalogue after his first year.[56]

Adams, graduating in 1861, continued his study of history under White, receiving in 1862 one of the first earned master's degrees. In that same year Tappan appointed him a junior faculty member. When White became president of Cornell in 1867, Adams replaced his mentor as professor of history.[57] Upon appointment, Adams immediately took a year's leave, to travel and study in France, Italy, and Germany. This *Wanderjahr* evidently stoked an already warm enthusiasm, inherited from Tappan and White, for the German university. Adams returned fired with the idea of extending, along German lines, White's reform of college history teaching.

This urge vented itself in a new course for seniors in 1871-1872—"something akin to the *Historische Gesellschoft* [sic] of the German universities." That is, a seminar: by some definitions the first taught in the United States. Adams sent his students off to write papers, armed with lists of assigned topics and of "the best authorities in the University library;" and each week class discussion centered on one of these student essays.[58] The seminar method struck a chord among students.[59] It soon popped up in a few other fields. It is hard to know exactly what Adams's imitators assumed they were imitating, but occasional hints suggest self-conscious discipleship to Germany.[60]

Yet were Adams and his colleagues really teaching seminars, properly called? In terms of the received history of graduate education, the answer is "No." The Michigan seminars catered mainly to advanced undergraduates, not graduates. Nor did the students in them pursue original research as now understood in American Ph.D. programs.[61] Adams's seminar (evidence is lacking for the others) centered on carefully directed exercises in the use of sources. Students wrote fairly short papers, typically using printed collections of excerpts from original sources and following a "pamphlet of 'questions' with references" prepared for them by Adams. Far from pursuing independent projects, each week all students in the seminar studied the same subject. To be sure, the seminar involved "a higher grade of historical investigation" than lectures; but Adams never hinted that it looked toward original research or even preparation for it (though presumably a student who intended a career as historian would have enrolled in the seminar).[62] Not any desire to train professional researchers, but dissatisfaction with the rote-learning, recitations, and elementary instruction of the old college curriculum, pushed the University's faculty toward the seminar.[63]

Yet these *Ur*-seminars probably resembled more closely than their descendants the practice of mid-nineteenth-century German universities. German universities, after all, had no "graduate" students, simply students. Seminars provided advanced training for those who intended to make a career in the field of the seminar—but not usually a career of original scholarship. Most students probably aimed to become Gymnasium teachers.[64] Indeed, until well after midcentury, training for pedagogy seems explicitly to have dominated the purposes of seminars.[65] German seminars did train students in research techniques, on the assumption that in this way a student achieved a sophisticated grasp of the subject matter. But something like Adams's small-scale exercises in using documents was probably much more common than the original research projects on which American seminars soon came to center.[66] If the early Michigan seminars now look more like undergraduate than graduate study, this was not because they were unfaithful to their German models.

The seminar was only one of a batch of changes at Michigan in the 1870s meant to raise the level of college work. The lecture method continued gradually to infiltrate instruction; the credit-hour system was introduced; and, in the late 1870s, the University expanded the number of electives permitted in undergraduate programs. Unlike the seminar, none of these had German associations (the lecture method having been around long enough at Michigan to lose its Teutonic coloration).

Yet, like the seminar, they had the unintended consequence of laying a firmer basis for postgraduate education. They freed faculty to teach more sophisticated and specialized courses and to devote more attention to advanced students. This upgrading of undergraduate education thus made realistic two changes in higher degrees introduced in the mid-seventies: the toughening of requirements for the master's and the awarding of the Ph.D. And, by 1880, twenty-one candidates for advanced degrees were enrolled in Ann Arbor. Not all were postgraduates: a reminder that "graduate education" had not yet jelled.[67]

The University followed the German model in its Ph.D. requirements: awarding it "on examination" for "special proficiency in some one branch of study, and good attainments in two other branches." A first degree and two years' residence were prerequisites. Research was probably from the beginning associated with the new degree in many cases, if not most. In 1879 the University formally declared that "faithful and industrious work" did not suffice; the candidate must also evince "power of original research and of independent investigation."[68] But it is not at all clear that the Ph.D. was primarily meant for researchers or even specialists; nor does research (as distinct from independent reading) seem always to have bulked large in Ph.D. work, especially outside the natural sciences.[69]

Frieze and Adams warmly supported all these innovations. Frieze hoped that they would lift Michigan "out of the narrow ruts" of the local college, make it "a national University."[70] But such scattershot changes did not create a true university. "It is manifestly difficult, if not impossible," Frieze wrote in 1880, "to change the Gymnasium into a University by merely building up a system of post-graduate courses, as a sort of annex to the old established curriculum of four years; for the post-graduate work will thus continue to be a mere subsidiary appendage, and the so-called Collegiate Department will still be the central and characteristic part of the institution."[71]

Frieze had long hungered for the day when Tappan's dream might take flesh in Ann Arbor. He wanted collegiate studies, pending their relegation to the high schools, pushed back into the first year or two of the Michigan course, leaving three years for university studies proper—explicitly on the model of the German universities.[72] Frieze found a zealous second in Adams. Angell, while not hostile to such ideas, was hardly the man to transform Michigan into Tappan's notion of Berlin. But, in 1880, Angell left Ann Arbor on a diplomatic assignment, and Frieze once again became acting president.

Acting presidents are not supposed to revolutionize their institutions. They do, however, have to respond to emergencies. In the spring of 1881 Frieze discovered a convenient pair of them. Judge Thomas M. Cooley, the star of the Law School, threatened to quit, unless he could shift his teaching to constitutional law and history. Frieze agreed, even proposed that Cooley lecture in the arts faculty as well as the Law School. Cooley replied that his courses might then be grouped with kindred subjects in a complete program. Frieze saw in this suggestion the means to douse another fire. Charles K. Adams's old teacher Andrew D. White was wooing Adams for Cornell, promising to let him organize a school embracing historical and political studies. Frieze offered to make Adams dean of a similar new outfit at Michigan—and trumped White by putting the celebrated Cooley on Adams's faculty. Thus was hatched the School of Political Science. [73]

Its presiding deity was Henry Philip Tappan. Adams, presumably in consultation with Frieze, designed the program to correspond to Tappan's vision of the true university—hitherto found only east of the Rhine. Students would enter the School of Political Science after completing their "secondary or gymnasial training" in the ordinary "required studies" of the first two years of college (at Michigan or elsewhere). Once admitted to the School, students learned through the methods proper to a university: lectures and seminars. After a minimum of three years' study, they became eligible to present a thesis and take oral examinations. The thesis had to show "elaborate study of the subject considered" and, "so far as is practicable ... original research." The orals tested "special proficiency" in one branch of knowledge and "good attainments" in two others. A sufficient degree of "excellence" on both thesis and examinations earned the Ph.D. The three-year term, the lectures and seminars, the thesis and examination, the major field with two minors, the Ph.D. as the ordinary university degree were all familiar features to German students. The School of Political Science was as close a replica of a German university as anything that had ever existed in America—or ever would.[74]

So close that it puzzled most of the University's faculty. The School of Political Science as such roused no notable opposition, but the awarding of the Ph.D. to its graduates ignited an explosion. Angell's son reported to his father a "quite warm" dispute pitting "Frieze & Adams vs the crowd." The crowd feared that awarding the Ph.D. after only five years of study "would cheapen the degree."[75] Frieze called them old fogeys, simply afraid to do anything differently than Harvard.[76] In any case, the faculty established a committee to report on the question–a committee that included Frieze and Adams among its five members.[77]

Both men conceived the School of Political Science in the larger context of reforming the traditional American college. Two months before Cooley suggested the new program, for example, Adams had written to Angell about allowing students more freedom of choice, even permitting the better of them to finish in three years or proceed to a master's degree in four. Frieze, in reporting to the Regents in June 1881, had suggested extending the principle of the new School to the entire faculty of Literature, Science, and the Arts.[78]

Frieze and Adams now used the faculty committee as a vehicle to do just that. Its report recommended including the rest of the arts and sciences faculty in this "true

University." A few modifications reassured the "old fogeys." Ultimately, the faculty further insisted that the Ph.D. thesis "evince power of research and of independent investigation"—the standard adopted in 1879—and that doctoral candidates learn enough French and German "for purposes of study." But with these concessions (and with the support of Angell, who returned at midyear) Frieze and Adams at last pushed through the faculty in the spring of 1882 an idea of university education dramatically new for America.[79] Its name echoed Tappan: the University System.[80]

Conventional college and postgraduate programs remained in place alongside the University System. At the end of the sophomore year, having completed what Frieze thought of as Gymnasium work, students elected either the ordinary credit system (itself a recent innovation) or the University System. The credit-system students took courses for two more years, accumulated credits, and earned a bachelor's degree, as American undergraduates still do. Students who opted to enter the "true University" attended lectures, took seminars, and pursued independent work, all focussed in groups of studies. (An attempt by Frieze and Adams actually to divide the arts and sciences faculty into four subfaculties—professedly following German practice, though not in fact very closely—had failed of adoption.) At the end of two years, the student took examinations in one major field and two minors. Students who merely passed received a bachelor's degree. Students who passed with distinction and presented an acceptable thesis received a master's degree. At the end of the third year came another examination in the three fields and another thesis. Students awarded the bachelor's degree at the previous examination now had a chance to present a thesis along with the examination and earn a master's. But, for those students who had earned the master's a year previously, leaping this final hurdle brought a Ph.D.

This seemed very like Tappan's German program of advanced education. And both structure and inspiration were indeed similar. Yet much had transpired in the nearly two decades since Tappan's ouster. Graduate education had become a reality (if not exactly a numerically overwhelmingly one), both at Michigan and elsewhere. The two or three "resident graduates" of the Tappan years had grown to a couple of dozen. Tappan's University Course took its rather airy form in a college populated by teenagers; Frieze and Adams could not help but take into account a critical mass of career-minded 25-year-olds. Moreover, Michigan faculty now had competing American programs of advanced education to measure their own against, not just foggily understood German ones. In the debate over the University System, professors drew comparisons to the Harvard Ph.D. as often as the German one.[81]

And the example of Harvard, Yale, or Hopkins weighed on the side of greater specialization, heavier stress on research. Research and publication, and with them specialization, had by this time worked their way into the normative conception of the university professor (though not yet the college professor). Professors, engaged in research, expected their advanced students to work with them; students, for their part, began to expect training in research as part of normal preparation for the life of professor.

Both professors and students began also to look upon the Ph.D. as certifying this sort of training. The degree was a foreign transplant brought in, repotted, watered, and beloved only by professors; it appealed, at first, to no other occupational group. Not surprisingly, most of the candidates for it hoped to become professors. Thus the degree itself became linked to professorial training–especially training in the skill that distinguished the high-powered new-model professor from the tattered older version: research. This linkage was reinforced by the centrality of specialized research in the careers of German professors, even though the educational program of German universities did not focus on research. The Ph.D. was, in Germany, the ordinary arts degree. But as the professor's degree in America, it acquired the character of the German professor rather than of the program in which he lectured.

Adams and Frieze's version of the German model had thus evolved some distance from Tappan's. As Tappan's disciples they kept alive a conception of German university education as culturally formative and broadly integrative. Yet, with its focus on three limited fields and its specialized thesis, their University System was more cramped than Tappan's University Course–even if closer to the realities of German education. They had diluted Tappan's understanding of the German system, informed by the incipient liberal arts ideal, with a substantial admixture of utilitarian motives. The compromises forced on them by skeptical colleagues pushed them further in this direction.

Thus, research held a secure place in the University System. Both Frieze and Adams believed that University professors bore an obligation to expand knowledge. The flexible rubrics of the University System allowed students to train for a specialized academic research career; a few of them, particularly in the natural sciences, seem to have done so. [82] President Angell went overboard in claiming that "original research of real worth will be expected in every case." In fact the requirements only mandated research "so far as the resources of the University permit"—not a stiff standard for students writing theses in, for example, American colonial history. Adams and Frieze would probably not have gone even this far, for they did not regard the Ph.D. as quintessentially a research degree. But their colleagues did and insisted that every thesis demonstrate the *capacity* for research.[83]

Yet the University System did not chiefly mean to train researchers or specialists.[84] Lecture courses, independent reading, the occasional seminar were expected to dominate workloads—as one might suppose when students began after the sophomore year. The typical thesis probably amounted to nothing more ambitious than today's undergraduate senior honors thesis. Nor did the curriculum focus effort on one discipline—in contrast to the graduate programs then developing at the Hopkins and elsewhere.[85] Whether the major and minor fields bore *any* relationship to each other depended on the inclinations of particular students and professors.[86] The University System fostered more concentration than the credit system, but it aimed no more at specialization than at the production of scholars.

The real intention was to produce effectively educated citizens. Frieze hoped to give students "a large and thorough preparation for the duties that will devolve upon them as citizens and members of society," to "fit them for those public duties to which every citizen is liable to be called."[87] Adams shared this outlook.[88] And on this point both were in harmony with Angell—which provides another reason for his support of the University System. In stressing the usefulness of such training—"preparation for duties" as distinct from formation of character—all three were leaning toward the utilitarian paradigm of college reform.

Finally, though, the University System subordinated utility and special training to wider ideals. An advanced education was here not tightly focussed but integrative. In the view of Frieze and Adams, even students training as specialists should learn to put their advanced training in the service of the common weal. Even students intending a research career should learn to fit their research into broader advances in knowledge. And, conversely, even students seeking a general education should learn to handle some special field with technical sophistication. Advanced education was still to be liberal education, though less full-blooded than in Tappan's version. As a later advocate of the University System explained, "The argument for a certain degree of specialization does not rest upon the demand for specialists but upon the claim that some practice in specialization is necessary to complete a liberal education. An educated man ought to be able to pass just criticism on the intellectual products of his own time..."[89] It was this sort of advanced but liberal education that Tappan believed German universities to supply. It was to provide this education that Frieze and Adams tried to reform the college—and simultaneously channel the emerging demand for graduate training—into the University System.

There is little point in rehearsing the actual deficiencies of the University System in supplying the article in question, which were considerable. There is even less reason to speculate on whether the University System could have realized this perhaps utopian vision. For the System sputtered and wheezed little past wishful thinking.[90]

Few faculty or students seemed to know what to do with it. Frieze and Adams could persuade their colleagues to approve the institutional changes constituting the University System; they could not implant in their minds the larger vision of the German university that infused these arrangements with appealing meaning. Only a handful of students entered the program.[91] At first the majority proceeded directly to master's degrees; but by 1886 the old notion had decisively reasserted itself that the bachelor's was the proper undergraduate degree; and the University System became simply an alternative to the credit system as *preparation* for an advanced education. No undergraduate ever proceeded to a Ph.D. on the University System. When Adams left for Cornell in 1885, only Frieze remained to speak for Tappan's idea of advanced education. He died in 1890. In effect, the University System had predeceased him.

Its demise in no way cramped the growth of other species of advanced education. Indeed, what became the conventional form of graduate education flourished in impudent good health—and without, it seems, deliberate feeding. Graduates showed up to work for an advanced degree, and faculty dealt with them catch-as-catch-can. The number of graduate students quintupled in the decade after 1881; by its end Angell was handing out three or four doctorates annually.[92] The students finally grew so numerous, their training so confused, that in 1891 the college set up a graduate school to manage the operation.[93]

The infant graduate school was swaddled in repeated invocations, almost ritual incantations, of its German pedigree.[94] Professors and students alike seem to have looked to Germany as their intellectual homeland. But their Germany was not Tappan's, Frieze's, or Adams's. It was the land of the German *professor*, not of German *education*. The operative image now of the German university refracted the Berlin of the research ideal, not of the *Bildung* ideal. The Ph.D. became linked exclusively to specialized training in original research. Descriptions of graduate courses stressed their technical nature and highlighted the distinction between graduate and undergraduate work.[95] Beginning in 1894, Ph.D. candidates had to choose as their two minor studies "cognate[s] to the major;" one of them could be simply "a more thorough treatment" of the major. The language requirement insisted on French and German "sufficient for purposes of research," as opposed to the earlier "purposes of study." The Ph.D. thesis now *had* to be "an original contribution to scholarship or scientific knowledge," "confined within narrow bounds," requiring at least "the greater part of one academic year" to prepare.[96]

The graduate student's virtue, one Michigan professor wrote in 1892, "is an independent scholarly grasp of one or two subjects." This man conceded that imparting a "general education" is "an honorable calling"—may even be good for the researcher in small doses—but "it is not the proper function of a university professor.'"[97] So much for Tappan. General education belonged in the preparatory years of the college. Advanced education meant specialized research training. Just when the liberal arts paradigm was finding a permanent home in the liberal arts college, the utilitarian paradigm was settling down for a long winter's nap in (among other places) the graduate school.

These sharp distinctions between undergraduate and graduate education did not force themselves on the University. To the contrary, the *inability* to find any real difference between the supposed two levels embarrassed Michigan professors time and again in the early years of graduate education.[98] They drew the line, not to map an existing divide, but to create one. An increasingly specialized and research-minded professoriate believed that mature knowledge should belong in specialized divisions, separate from general culture; and they acted so as to give life to their belief. By doing so they brought to birth the graduate school and killed the University System.

VI.

Tappan's vision of the American college transformed into a true university starved in an environment that gave it no sustenance. For by the 1880s the American college had reconstructed itself in forms that left no place for any scheme like the University System. On the one hand, the liberal arts paradigm had defined the *college* as a place where students absorbed general culture before going on to advanced training. The turn-of-the-century college might voice the Mr. Chips ideal of the Amhersts and

Williamses; it might fly the flag of maturity-through-independence, like the Harvards and Michigans with their elective systems. But general education, understood as the province of the college, was inevitably understood as preparatory.

On the other hand, the utilitarian paradigm increasingly expressed itself in specialized training, with knowledge cut up into segments related only instrumentally. To the traditional law schools, medical schools, and divinity schools were added engineering schools, business schools, education schools, and the like. The new graduate schools of arts and sciences resembled these, with the crucial difference that the graduate school did not define its subject (its equivalent of engineering or divinity) as any applied skill but as "pure knowledge."[99] This knowledge meant, not the general culture of the college, but specialized disciplines only marginally related to the discourse of other specialized disciplines. And advanced education meant training in research in one of these specialized disciplines. A student who moved from the preparatory education of the college to the advanced education of the graduate school left general culture behind.

And this increasingly clear division of labor brought with it a change in the meaning of "the German model." If Michigan is typical, German influence neither increased nor diminished between the 1850s and the 1890s. (And the histories of other major universities do suggest, *mutatis mutandis*, a similar pattern.[100]) But what German example was held to teach varied enormously from time to time and place to place. Broadly and very tentatively speaking, in the 1850s (and probably earlier), the university-Gymnasium distinction, the lecture system, and perhaps the *Bildung* ideal suggested ways to upgrade college education—but probably nothing like the professional graduate school. Yet by the 1880s the German research ideal suggested, or at least legitimized, just the sort of undergraduate-graduate distinction institutionalized in the graduate school. To be sure, German universities had changed over these years; most to the point, by the 1880s seminars and laboratories had developed into highly visible institutions dedicated to research. But more important were changes in the American context, notably in the character of the professoriate, that encouraged American academics to read the German evidence differently.

Out of the cocoon of the old-fashioned American college, then, emerged that strange schizophrenia native to the New World, the American university. The graduate school and the new-model college evolved as distinct, largely unconnected entities. In them the same faculty often taught, students moved from one to the other; but, in each, different educations and different conceptions of knowledge prevailed.

For a while in the 1850s and 1860s, it looked as if the Prussian road would lead Americans to something rather like a supercharged liberal arts college, drawing students from a souped-up high school. But, around the 1870s, most American academics began interpreting the highway markers differently; so the road veered sharply. More precisely, Americans discarded the *educational* program of German universities.[101] They then took the German invention of highly specialized *professorial* research—not, properly speaking, a part of German university education at all—

and built on it the advanced segment of American university education. Precisely because specialized research training made no sense for most university students, such advanced education had to be split off from the ordinary university course. This division compounded the irony of stealing the ordinary German degree for the use of the graduate school.

This transmogrification of German practice was the really substantial American contribution to the research university. The Germans invented the research ideal. The Americans invented an institution to house and perpetuate it. By throwing this distinction into sharper relief—and by clearing away the underbrush that has obscured some roads not taken—Michigan's story helps to clarify the knotty problem of German influence in American university history.

It also reminds us that the founding principles of the graduate school defined graduate training in self-conscious opposition to general education and common culture. The ever-narrowing gyre of specialization was no accidental spin-off from the modern fragmentation of knowledge, but the flight-plan of the graduate school from its launching.

NOTES

[1] This article has benefited from the comments of several colleagues—Bernard Bailyn, Hugh Hawkins, David Hollinger, Joel Howell, George Marsden, Jonathan Marwil, Nicholas Steneck, and Stephen Tonsor—and from the financial support of the Rackham School of Graduate Studies. A version with thicker documentation appeared in *Rackham Reports*, 1988-89, pp. 6-52; scholars wishing fuller detail of the history of the University of Michigan should refer to it.

[2] The most cogent summing up of the story is Laurence R. Veysey's justly influential *The Emergence of the American University* (Chicago, Ill.: University of Chicago Press, 1965), esp. 10, 12-13, 125-33, 153-58.

[3] See, e.g., James McLachlan, "The American College in the Nineteenth Century: Toward a Reappraisal," *Teachers College Record* 80 (1978): 287-306. Three especially consequential figures whose personal visions and intellectual progeny, while recognized in the historical literature, have not yet been sufficiently taken into account: Eliphalet Nott of Union College, Francis Wayland of Brown, and Henry P. Tappan of Michigan. Because university history, even more than military history, is written from the standpoint of the victors, the importance of an institution like Harvard is exaggerated all out of contemporary proportion, while that of a place like Union is diminished into anachronistic insignificance. Brown and Michigan were probably the most talked-about and influential exemplars in the formative decade preceding the emergence of modern universities (c. 1855-65); and the presidents who gave them prominence, Wayland and Tappan, were both nurtured by Nott at Union and freely acknowledged their debt to him. Wayland and Tappan, in turn, were each mentors of the founding president of Cornell, Andrew Dickson White, influencing his educational ideas far more than did the teachers at White's alma mater, Yale. White, along with Gilman of the Hopkins, was the key figure in the creation of the modern university.

[4] This part of the saga—treated, as until the 1970s it almost invariably was, as merely preface to the *real* story of American higher education—is summed up in Veysey, *American University*, pp. 1-18.

[5] Some uncertainty prevails about who went first to Germany and when. This confusion about priority matters little, for it is clear that significant scholarly pilgrimages to Germany began immediately after the War of 1812, when men like George Ticknor and Edward Everett studied in Germany and then returned to apply their foreign learning (at least temporarily and often without much effect) in American colleges. Ultimately some nine or ten thousand Americans matriculated in German universities between the end of the Napoleonic Wars and the outbreak of the First World War—often, however, seemingly only for a term. The statistical data are not full enough to permit more than broad generalizations about patterns of American attendance at German universities. The University of Göttingen seems to have been at first the most popular destination, owing both to its receptivity to English-speakers—its Hanoverian rulers happened also to be kings of England until 1837—and to its calculated efforts to make itself attractive to *Ausländer*. (On this policy, essentially mercantilist in intent, see, e.g., Ilse Costas, "Die Sozialstruktur der Studenten der Göttinger Universität im 18. Jahrhundert," in *Anfänge Göttinger Sozialwissenschaft* [Göttingen, 1987], pp. 128-29.) Long before midcentury, however, Berlin, Halle, and Leipzig had achieved parity with Göttingen in numbers of American students. Heidelberg also became popular after about 1850. By the 1860s Berlin had become preeminent in attracting Americans.

There is no thorough study of the whole phenomenon, despite its importance to the German Model of American university history. But see Carl Diehl, *Americans and German Scholarship, 1770-1870* (New Haven, Conn.: Yale University Press, 1978), esp. chap. 3, and Jurgen Herbst, *The German Historical School in American Scholarship: A Study in the Transfer of Culture* (Ithaca, N.Y.: Cornell University Press, 1965), esp. chap. 1; the footnotes in Diehl and Herbst provide a reliable guide to the older sources. Histories of the relevant German universities themselves do not have much to say about American students—not even the recent flood of books celebrating the 250th anniversary of Göttingen (though some of this latter batch are helpful in understanding the subjects Americans went there to study, notably Bernd Moeller, ed., *Theologie in Göttingen: Eine Vorlesungsreihe* [Göttingen, 1987], especially the essay by Rudolf Smend that discusses the great magnet J. G. Eichhorn.) The records of the "American Colony" in Göttingen (a sort of non-dueling *Burschenschaft* for U.S. students) have been printed: P. G. Buchloh and W. T. Rix, *American Colony of Göttingen* (Arbeiten aus der Niedersächsischen Staats- und Universitätsbibliothek Göttingen, Bd. 15; Göttingen, 1976). They provide some sense of what life was like for Americans at the university—and of how superficial their connection with German academic life commonly was.

One of the greatest obstacles to serious work on German influence in American universities is the dilapidated state of German university history itself, fallen upon very hard times since the pioneering work of Friedrich Paulsen around the turn of the century. It is often difficult simply to find out what professors and students actually did in the German universities where Americans studied.

[6] Among these educational investigators were Charles W. Eliot, the creator of modern Harvard; Daniel Coit Gilman, founder of Johns Hopkins; and Michigan's founding president, Henry P. Tappan. Travelers with other purposes who nevertheless devoted considerable time to studying German universities while on their journeys included Andrew Dickson White, founding president of Cornell; and Charles Kendall Adams, White's successor at Cornell (1885-92) and then president of Wisconsin (1892-1902).

[7] The most helpful monographs on the episodes mentioned are David Tyack, *George Ticknor and the Boston Brahmins* (Cambridge, Mass.: University of Harvard Press, 1967), chap. 3; Hugh Hawkins, *Pioneer: A History of Johns Hopkins University, 1874-1889* (Ithac, N.Y.: Cornell University Press, 1960); *idem*, *Between Harvard and America: The Educational Leadership of Charles W. Eliot* (New York, N.Y.: Oxford University Press, 1971); and Robert A. McCaughey, "The Transformation of American Academic Life: Harvard University, 1821-1892," *Perspectives in American History*, 8 (1974): 239-332.

[8] Influential examples include Burton J. Bledstein, *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America* (New York, N.Y.: Norton Press, 1976); Thomas L. Haskell, ed., *The Authority of Experts: Studies in History and Theory* (Bloomington, Ind.: Indiana University Press, 1984), Part Two; and Magali Sarfatti Larson, *The Rise of Professionalism* (Berkeley, Calif.: University of California Press, 1977). Professionalization and historiographically related concepts like the search for cultural authority are useful, for professionalization was certainly *one* of the things involved in the emergence of the modern professoriate and research university, with all of the specialization involved in both. Whether professionalization is *the* key to understanding these developments is, to say the least, debatable. In any case, professionalization makes a poor organizing theme for university history: It is too blunt an instrument and misses too much of what was going on within colleges and universities. In part, this latter defect arises because the sociological concept of professionalization developed (obviously) with reference to the structure of certain adult careers (initially, the traditional professions). Professionalization thus refers only secondarily and *selectively* to education, however important education may be in the processes of professionalization. Hence, conceptually "external" to education, referring primarily to broad social-structural trends, professionalization fails to take account of much that is distinctive within universities.

[9] A study sensitive to both the pull of German example and American deviation from it is Nathan Reingold, "Graduate School and Doctoral Degree: European Models and American Realities," in *Scientific Colonialism: A Cross-cultural Comparison*, ed., Reingold and Marc Rothenberg (Washington, D.C.: Smithsonian Institution Press, 1986), 129-49.

[10] "Qualified" means that the student had studied at a *Gymnasium* and earned an *Abitur*—also institutions of which real American equivalents never developed, though the University of Michigan moved in the direction of promoting them in the 1870s and 1880s. It has been argued that the elective system was the American equivalent of *Lernfreiheit*, but this seems a pretty faint shadow of the real thing.

[11] Indeed, most German students never even took a university degree but used their university studies as preparation for a *Staatsexamen*.

[12] Charles William Eliot, *A Turning Point in Higher Education: The Inaugural Address of Charles William Eliot as President of Harvard College, October 19, 1869* (1869; rpt., Cambridge, Mass.: Harvard University Press, 1969), 7. This distance from the German Model did not much lessen during the remainder of Eliot's career: see Hawkins, *Between Harvard and America*, *passim*.

[13] See, e.g., Veysey, *American University*, 158-59. The best study of the first decades at the Hopkins is Hawkins, *Pioneer*.

[14] Robert Morris Ogden, ed., *The Diaries of Andrew D. White* (Ithaca, N.Y.: Cornell University Press, 1959), 98-108. *Cf.* Buchloh and Rix, *American Colony, passim.*

[15] Richard Hofstadter and Wilson Smith, eds., *American Higher Education: A Documentary History* (2 vols.; Chicago, Ill.: University of Chicago Press, 1961), 1:256, 262-63; Motley to his mother, July 1, 1832, in G. W. Curtis, ed., *The Correspondence of John Lothrop Motley* (New York, 1900), 1: 19-23.

[16] On the inherited traditions, see especially Samuel Eliot Morison, *The Founding of Harvard College* (Cambridge, Mass.: Harvard University Press, 1935), chaps. 1-10, notably chap. 4. Two recent studies cast light on the Renaissance origins of this curriculum and thus make clearer why it began to seem obsolete in the nineteenth century, though not much earlier: Anthony Grafton and Lisa Jardine, *From Humanism to the Humanities: Education and the Liberal Arts in Fifteenth- and Sixteenth-Century Europe* (Cambridge, Mass.: Harvard University Press, 1986), and Bruce A. Kimball, *Orators and Philosophers: A History of the Idea of Liberal Education* (New York, N.Y.: Columbia University, 1986).

[17] The Yale Report was published (slightly abridged) as "Original Papers in Relation to a Course of Liberal Education," *The American Journal of Science and Arts* 15 (1829): 297-351. Most of it is reprinted in Hofstadter and Smith, *American Higher Education*, 1:275-91, from which the quoted phrase is taken (p. 278).

[18] For sake of necessary compactness, this statement grossly oversimplifies a very confused situation. Clear distinction of these two paradigms is possible only in retrospect, though contemporaries were certainly aware of tugs in these directions.

[19] Veysey, *American University*, comes close to this model, identifying three paradigms ("Liberal Culture," "Utility," and "Research") as competing with the old "Mental Discipline" for the soul of the university. Veysey neglects the longer historical context and meaning of the old classical curriculum (which he identifies solely with its antebellum defense as "mental discipline"). His category of "research," we suspect, had less to do with *educational* programs than with other faculty activities, at least until very near the end of the century. This was, at any rate, true at Michigan, as appears below.

To say, as we do, that "the liberal arts ideal" had taken shape by the 1880s is to ignore a host of difficulties as to what it was: see Kimball, *Orators and Philosophers*.

[20] Charles Eliot Norton, "Harvard University," in *Four American Universities: Harvard, Yale, Princeton, Columbia* (New York, 1895), 32-35 (page reference *sic*: pp. 33-34 are occupied by a photograph). The relation of this educational ideal to the broader Victorian ideal of "culture" goes without saying.

[21] Quotation from Reingold, "Graduate School," p. 135. For White's reliance on Tappan's vision, see Glenn C. Altschuler, *Andrew D. White: Educator, Historian, Diplomat* (Ithaca, N.Y.: Cornell University Press, 1979), 42. White's student and successor as professor of history at Michigan, Charles Kendall Adams, followed him as president of Cornell and then went on to become one of the two presidents who transformed Wisconsin into a research university. The other was Thomas Chamberlin, who received graduate training at Michigan in the afterglow of the Tappan years. See Merle Curti and Vernon Carstensen, *The University of Wisconsin: A History, 1848-1925* (2 vols., Madison, Wisc.: University of Wisconsin Press, 1949), esp. 1: 545-46, 561-79.

[22] For the early history of the University, see Wilfred B. Shaw, *The University of Michigan: An Encyclopedic Survey* (Ann Arbor, Mich.: University of Michigan Press, 1942), 1: 10-38, and Burke A. Hinsdale, *History of the University of Michigan*, ed. Isaac N. Demmon (Ann Arbor, 1906), chaps. 2-6. In general, Shaw is stronger on politics, Hinsdale on curriculum; both have the encyclopedic quality, if not always quantity, promised in Shaw's title. See also John D. Pierce, "Origin and Progress of the Michigan School System," *Pioneer Collections: Report of the Pioneer Society of the State of Michigan*, 1 (1877): 37-45, and Charles Kendall Adams, *Historical Sketch of the University of Michigan* (Ann Arbor, 1876), 12.

One point here is that Henry P. Tappan's zeal for Cousin's version of Prussia was not innovative. Another point, however, is that the initial Michigan version of the "Prussian system" involved the relations between the University and other educational institutions in the state, rather than the character of the University itself. Adams, *Historical Sketch*, p. 16, disclaims any Prussian influence on the university's internal organization or curriculum before Tappan's arrival, a conclusion supported by the other available evidence.

[23] Hinsdale, *History*, p. 76; *University of Michigan Catalogue of the Officers and Students in the Department of Arts and Sciences*, 1843-44 (Ann Arbor, 1843?).

[24] George Bancroft, Henry Barnard, and a New York minister, the Rev. William Adams, possibly others, turned down the job before the Regents finally named Tappan. It was Bancroft who raised Tappan's name, having heard of him initially, it seems, from none other than Victor Cousin. Shaw, *Encyclopedic Survey*, 1: 39-40; Charles M. Perry, *Henry Philip Tappan: Philosopher and University President* (Ann Arbor, 1933), 169-71.

[25] Hinsdale, *History*, pp. 42-43; Perry, *Tappan*, pp. 169-70; Adams, *Historical Sketch*, pp. 15-16. The quotation is from the first catalog issued under Tappan's direction (1852-53), which proudly declared that Michigan had copied its educational system from the Prussian. *Catalogue of the Corporation, Officers and Students in the Departments of Medicine, Arts and Sciences in the University of Michigan. 1852-53* (Detroit, 1853), 19.

[26] Henry P. Tappan, *A Discourse ... on the occasion of his Inauguration as Chancellor of the University of Michigan, December 21st, 1852* (Detroit, 1852), 37, 40. For the course of events during Tappan's administration, see Hinsdale, *History*, chap. VII, and Shaw, *Encyclopedic Survey*, 39-53.

[27] Quoted in Hinsdale, *History*, pp. 43-44. Tappan wrote that he wished to make the "correspondence" between college and Gymnasium "as complete as possible." *Catalogue ... 1852-53*, p. 20. In his long-term ideal of American *Gymnasia* feeding real American universities, and in his shorter-term goal of making the University at least a respectable *Gymnasium*, Tappan closely resembled George Ticknor at Harvard in the 1820s. See Tyack, *Ticknor*, chap. 3. It appears that the "German ideal" before 1860 was invoked more to support general elevation of academic standards and relegation of rote-learning to secondary schools than to advance any scheme resembling a research university. The identification by Americans of the German university with the *discovery* of knowledge seems *mostly* a postbellum development. *Cf.* Veysey, *University*, pp. 128-29.

[28] *Catalogue ... 1852-53*, p. 20.

[29] Tappan, *Discourse ... on Inauguration*, pp. 42-45. The state legislature had mandated some such instruction in the Reorganization Act of 1851 (Hinsdale, *History*, p. 44). Tappan was quite likely also influenced by the similar curricular reform set in place by Francis Wayland at Brown two years before Tappan reached Ann Arbor.

[30] Adams, *Historical Sketch*, p. 17.

[31] Tappan, *Discourse ... on Inauguration*, pp. 21-22, 35. These were the traditional four faculties of the German university. Medicine, law, and philosophy (i.e., the arts and sciences faculty, called at Michigan Literature, Science, and the Arts), Tappan pointed out, were already organized. Recognizing that in an American state university theology must "be left to the different denominations," Tappan urged them to set up theological schools in Ann Arbor. (They did not take up his invitation.) Tappan, *Discourse ... on Inauguration*, pp. 47-48; *Catalogue ... 1860-61*, p. 32.

[32] *Catalogue ... 1852-53*, p. 21.

[33] *Catalogue ... 1852-53*, p. 21.

[34] Yale Report, in Hofstadter, *Higher Education*, 1: 278.

[35] *Catalogue ... 1852-53*, p. 21.

[36] *Catalogue ... 1852-53*, pp. 21, 26.

[37] *Catalogue ... 1852-53*, pp. 21, 26. A decade later, in 1863, Harvard's President Thomas Hill inaugurated a superficially similar innovation called "University Lectures." Although regarded by Charles W. Eliot as ancestral to the graduate school, this program differed from the University Course both in its more occasional nature and in its intended audience: a melange of curious citizens and interested postgraduates, as distinguished from graduate and equivalently prepared students pursuing a regular course. *Cf.* Charles H. Haskins, "The Graduate School of Arts and Sciences, 1872-1929," in Samuel Eliot Morison, ed., *The Development of Harvard University Since the Inauguration of President Eliot, 1869-1929* (Cambridge, Mass., 1930), 453.

[38] *Catalogue ... 1852-53*, p. 26.

[39] Tappan probably could not read German at this period of his life (indeed was not at ease even in French). Most of his crucial notions about German education seem to have come from Cousin's report on the Prussian system, itself more a reflection of Humboldt's ambitions than Prussian realities.

[40] *Catalogue ... 1852-53*, p. 28. *Cf.* Henry P. Tappan, "Annual Report of the Chancellor [October 1854]," in *University of Michigan Regents' Proceedings ... 1837-1864* (Ann Arbor, 1915), 599; Hinsdale, *History*, p. 88. It is unclear whether Tappan originally expected students in the University Course to be examined or to take a degree, though the Master's became explicitly linked to it in 1858-59 when the University Course took rather scrawny flesh as the "Programme of Studies for the Degrees of A.M. and M.S."

[41] Tappan seems especially to have encouraged research in the natural sciences. See Alan Creutz, *From College Teacher to University Scholar: The Evolution and Professionalization of Academics at the University of Michigan, 1841-1900* (Ph.D. diss., U. of Michigan, 1981), 2: 232, 243-48. This appearance may, however, owe more to accidents of personnel and to the American context (where academic research in the humanities developed later than in the natural sciences) than to any special proclivities of Tappan's.

[42] Tappan expected University Course students to pursue "free and independent study" as well as to attend lectures. Tappan, "Annual Report [1854]," p. 599.

[43] The use of the phrase "the University proper" to refer to the University System occurs in *Catalogue of the Officers and Students of the University of Michigan: 1854-55* (Ann Arbor, 1855), 33.

[44] Henry P. Tappan, *University Education* (New York, 1850), 11; *idem*, "Report of the President [October 1856]," in *Regents' Proceedings ... 1837-1864*, pp. 664-66. In the latter document, Tappan made a distinction between *teaching* undergraduates and *lecturing to* graduates.

[45] Indeed, Tappan had a strong sense of the interconnectedness of all knowledge, utterly remote from caricatured notions of German professors, but fairly close to the German *Bildung* ideal associated with Humboldt's name. See, e.g., Tappan, *The University; Its Constitution: A Discourse Delivered June 22, 1858* [to the Christian Library Association of the University of Michigan] (Ann Arbor, 1858), 17-18.

[46] The catalogues list specific courses beginning in 1858-59, when the rubric of "Programme of Studies for the Degrees of A.M. and M.S." replaced the old "University Course" section, with its hopeful listing of twenty broad subjects under which instruction was eventually anticipated. *Cf. Catalogue ... 1858-59*, p. 47. Names of students, including "resident graduates," were printed in the catalogues.

[47] *Cf.* E. O. Haven, *Universities in America: An Inaugural Address Delivered in Ann Arbor, Michigan, October 1st, 1863* (Ann Arbor, 1863), esp. 3-5. Haven (mostly) tells his own story in the posthumous *Autobiography of Erastus O. Haven, D.D., LL.D.*, ed. C. C. Stratton (New York, 1883); see esp. chaps 5, 7, 8.

[48] *Catalogue ... 1863-64*, p. 18; *1867-68*, p. 12; *1868-69*, p. 11, and *1870-71*, p. 11. The catalogues from 1864-65 through 1866-67 do not list graduate students; this does not prove that there were none.

[49] Frieze's most lasting contribution to the University, not directly relevant here, was the admission of women on a basis of near equality with male students. There is no biography; see the accounts in the general University histories and James B. Angell, *A Memorial Discourse on the Life and Services of Henry Simmons Frieze, LL.D.* (Ann Arbor, 1890); quotation from 16.

[50] The *Abitur* not only certified successful completion of the Gymnasium course but *ipso facto* qualified a student for university admission.

[51] Hinsdale, *History*, p. 60; Creutz, College Teacher, 1:96-99, 156-57; and correspondence from school principals in the James B. Angell Papers, Michigan Historical Collections, Bentley Library, University of Michigan. *Cf.* University of Michigan *President's Reports*.

[52] The only substantial biography is Shirley W. Smith, *James Burrill Angell: An American Influence* (Ann Arbor, Mich.: University of Michigan Press, 1954); see also James B. Angell, *Reminiscences* (New York, 1912).

[53] Angell did see some good things in the German university; and, at least in his earlier years, he showed sympathy for research. His increasingly cautious attitude in later career toward research is evident in, e.g., his *The New Era in Higher Education* (Ann Arbor, 1902).

[54] Angell, *Frieze*, pp. 14, 21-22.

[55] Adams to Herbert Baxter Adams, 9 Feb. 1886, in W. Stull Holt, ed., *Historical Scholarship in the United States, 1876-1901: As Revealed in the Correspondence of Herbert B. Adams* (Baltimore, 1938), 79. On White at Michigan, see Ruth Bordin, *Andrew Dickson White: Teacher of History* (Michigan Historical Collections Bulletin No. 8; Ann Arbor, 1958).

[56] *Catalogue ... 1858-59*, p. 40. *Cf. Catalogue ... 1859-60*, p. 49. It is important to stress how great the change in college education was when its basis shifted from recitations to lectures—and how closely identified this method was with the German universities. See, e.g., the comments on a similar innovation at Harvard thirteen years later, in Chauncey Wright to Grace Norton, January 13, 1870, in Norton Family Papers, Houghton Library, Harvard University.

[57] Adams taught both history and Latin from 1863-67. The only biography is Charles Forster Smith, *Charles Kendall Adams: A Life Sketch* (Madison, 1924), about as full an account as the subtitle suggests. Adams's twenty-four years at Michigan get thirteen pages, the bulk of which, fortunately for present purposes, concern the method and character of his teaching, including the famous seminar. Adams's career is likely to remain obscure, for Smith (who based his own account largely on recollections of Adams's colleagues) noted that all personal papers were destroyed in a fire at Wisconsin. Information on Adams as president of Cornell (where he pretty clearly tried to transplant a version of the University System that he and Frieze had developed at Michigan) is in Morris Bishop, *A History of Cornell* (Ithaca, N.Y.: Cornell University, 1962), esp. chaps. 15-17; and on Adams as president of Wisconsin in Curti and Carstensen, *Wisconsin*, esp. 1: 561-79.

[58] *President's Report to the Board of Regents, for the Year Ending June 30, 1872* (Ann Arbor, 1872), pp. 32-33. Adams later described the purpose of the course as "to direct the student in the work of original historical investigation" rather than to "impart actual instruction"; but he apparently meant that students were set to work in standard collections of printed sources to find data for their class essays, not that they were expected to come up with new ideas or information. *President's Report ... 1874*, pp. 27-28

Henry Adams (who had himself approached, though never quite embraced, study at Berlin) was apparently teaching his students at Harvard by similar methods from 1870-71, though the class seems not to have been called a seminar and never to have adopted training in original research as a explicit goal. Adams did introduce a postgraduate seminar, as such, in 1875. See Ernest Samuels, *The Young Henry Adams* (Cambridge, Mass.: Harvard University Press, 1948), esp. 211-12, 215; Adams's own inimitable account is in *The Education of Henry Adams* (Boston, 1918), 299-304. William C. Russel seemingly did something similar in constitutional history courses at Cornell from 1868, though it is unclear whether his students were sent to primary sources. Bishop, *Cornell*, p. 163.

Charles K. Adams later gave the date of his introduction of the seminar as 1868 (Adams, *The Part of the University of Michigan in Higher Education* [n.p., n.d. (c.1885)], 10) and as 1869 (Adams to H. B. Adams, February 9, 1886, in Holt, *Historical Scholarship*, 79). Likely, Adams's memory was tricked by recalling his intentions upon his return from Germany (which did occur in 1868). It is possible that some sort of informal seminar was in operation before 1871. But contemporaneous evidence, including Adams's own account in the *President's Reports*, supports the date of 1871 for the first seminar officially offered.

On the introduction of the seminar more generally, see Veysey, *American University*, pp. 153-58.

[59] *President's Report ... 1874*, pp. 27-28.

[60] E.g., the reference to *Quellen* in Moses Coit Tyler to George H. Putnam, August 9, 1875, quoted in Howard Mumford Jones, *The Life of Moses Coit Tyler* (Ann Arbor, 1933), p. 176. Tyler was Adams's first imitator.

[61] We take "original research" in this sense to mean the effort to discover information, or implications of information, not previously recognized. Put differently, original research is the effort to advance knowledge.

[62] A. D. White to J. B. Angell, September 30, 1874, in Angell Papers; James B. Angell, *President's Report ... 1883*, pp. 9-10. *Cf.* Adams to "the joint Committees of the Board of Regents of the University," July 5, 1877, in Angell Papers. Given the character of Adams's seminar, it was not at all surprising that a graduate of it thought it feasible "to apply the 'Seminary' method" in high schools. Mary S[heldon]. Barnes to Angell, January 2, 1886, in Angell Papers. (Mary D. Sheldon, later Barnes, graduated A.B. in 1874, seems not to have taken a higher degree, at least not at Michigan.)

[63] Jones, *Tyler*, pp. 161, 164.

[64] See, e.g., R. Steven Turner, "The Growth of Professorial Research in Prussia, 1818 to 1848—Causes and Context," *Historical Studies in the Physical Sciences* 3 (1971): 146.

[65] This was, of course, not "teacher training" as in later education faculties. *Cf.* Wilhelm Erben, "Die Entstehung der Universitäts-Seminare," *Internationale Monatsschrift für Wissenschaft, Kunst, und Technik*, 7 (1913): 1248-60. Erben's two-part article is the only substantial history of the German seminar, though hardly a satisfactory one. Less full but more easily available is the account in Friedrich Paulsen, *Geschichte des gelehrten Unterrichts*, 3rd ed., ed. Rudolf Lehmann (Berlin and Leipzig, 1921), which sketches the history of the seminar in 2: 258-59, 270-75, and passim.

[66] We say "probably" because, on the basis of existing scholarship, it is hard to be sure of standard practice inside German seminars. For hints about the internal workings of German seminars before the late nineteenth century, see, e.g., Erben, "Entstehung der Seminare," 1251, 1253; Herbert Baxter Adams to Daniel Coit Gilman, May 21, 1876, in Holt, *Historical Scholarship*, p. 31; Hartmut Boockmann, "Geschichtsunterricht und Geschichtsstudium," in *Geschichtswissenschaft in Göttingen: Eine Vorlesungsreihe* (Göttingen, 1987), 172-76; Walter C. Perry, *German University Education; or, the Professors and Students of Germany* (London, 1845), 97-98. *Übungen*, not *Forschung*, is the word that recurs in descriptions of seminar work. Fred M. Fling, "The German Historical Seminar," *The Academy*, (1889): 129-39, 212-19, gives a detailed account of the routine in Maurenbrecher's Leipzig seminar in the late 1880s and can be used cautiously to interpret the more scattered bits of information about earlier seminars, if one remembers that by the 1880s German seminars had shifted decisively to their mature research orientation.

Part of the difficulty in exploring the seminar is that historians tend to take programmatic statements, especially the seminar statutes, as representing practice—rather as if students of American politics drew their evidence from party platforms. This is true even of the best scholars of German university history (see, e.g., Turner, "Professorial Research," 145; *idem*, "The Prussian Universities and the Concept of Research," *Internationales Archiv für Sozialgeschichte der deutschen Literatur*, 5 [1980]: 88.) Anthony Grafton is a notable exception ("Polyhistor into *Philolog*: Notes on the Transformation of German Classical Scholarship, 1780-1850," *History of Universities*, 3 [1983]: 163-69) but unfortunately not helpful on the point in question here.

To say that seminars before the last quarter of the century were typically not focussed on serious original research is of course not to deny the exceptional seminar, the exceptional student in the ordinary seminar, and certainly not the importance of original research in the careers of German professors and of their students intending to proceed to habilitation.

[67] The final abolition of the "in course" master's and the awarding of the first Ph.D. both occurred in 1874. *Catalogue ... 1874-75*, p. 18. The twenty-one candidates are mentioned in Frieze to Angell, October 9, 1880, in Angell Papers.

[68] *Catalogue ... 1874-75*, p. 18; *Catalogue ... 1879-80*, p. 65. But note the absence of any such express requirement before 1879. The most explicit statement of faculty expectations in the first years is a report of a faculty committee "to consider what steps should be taken in regard to examination of candidates for the degree of Doctor of Philosophy," May 29, 1876, in Records of Registrar, University of Michigan, Michigan Historical Collections. This report contains no mention of original research and no indication that the thesis was required to show such. Frieze and Adams were two of the three members of the committee.

[69] See, e.g., George B. Groff to Angell, September 8 and 24, and November 15, 1876, and C. K. Adams to ?, June 15, 1878, in Angell Papers. The reports on examinations of candidates for advanced degrees, in Records of the Registrar, provide helpful instances of what sort of work was done. It does seem that natural scientists typically regarded the Ph.D. as a research degree from the outset.

[70] Angell, *Frieze*, pp. 26-27; Smith, *Adams*, p. 19.

[71] Henry S. Frieze, *The President's Report to the Board of Regents, for the Year Ending June 30, 1880* (Ann Arbor, 1880), 10.

[72] Angell, *Frieze*, p. 29; Frieze, *President's Report, for ... 1880*, pp. 10-11.

[73] Frieze to Angell, July 9, 1881, in Angell Papers.

[74] *Calendar of the University of Michigan for 1881-82* (Ann Arbor, 1882), 74-82; Frieze, *President's Report, for ... 1881*, pp. 2-4; C. K. Adams to Angell, July 6, 1881, in Angell Papers.

[75] Alexis Angell to J. B. Angell, October 10, 1881; *cf.* M. L. D'Ooge to Angell, November 29, 1881, and W. H. Pettee to Angell, November 28, 1881; all in Angell Papers. Curiously, the opposition was initially led by Martin L. D'Ooge, the only Michigan professor at the time who held a German Ph.D. (Leipzig, 1872). D'Ooge came around to the support of Frieze's proposed University System later in the fall, indeed served on the committee that devised it.

[76] Frieze to Angell, October 25 and November 26, 1881, in Angell Papers.

[77] See packet marked "Relations of the School of Political Science to the Literary Department," in Reports and Resolutions, 2nd semester, 1881-82, Records of Registrar.

[78] Adams to Angell, March 6, 1881, in Angell Papers; Frieze, *President's Report, for ... 1881*, pp. 4-18. (These pages comprise the fullest statement of Frieze's idea of a university and are essential to understanding what happened in 1880-82.)

[79] Frieze to Angell, November 26, 1881; "Relations of the School ... to the Literary Department." For the language requirement, see Reports and Resolutions, 2nd Semester 1881-82, Records of Registrar. Although the language requirement appears separately from the resolutions enacting the University System in the faculty records, the timing of its adoption—May 1, 1882, the same date the University System was approved—leaves little doubt that it was part of the same package. To assuage faculty concerns that students would fritter away their time, each student had a three-member faculty committee to supervise her or his program: the putative ancestor of the dissertation committee.

[80] For the development of the University System, see Frieze, *President's Report, for ... 1881*, pp. 4-18; Frieze to Angell, November 26, 1881; and "Relations of the School ... to the Literary Department." For its final form, see *Calendar ... for 1882-83*, pp. 63-65, subsequent *Calendars*, and Angell to Helen Magill, May 3, 1882, in Angell Papers.

[81] Curiously, Johns Hopkins, supposed by historians of higher education to have set the most widely emulated example for American graduate programs, never appears in the records of the debate. It should, however, immediately be said that the records are pretty skimpy.

[82] At every stage of the development of advanced degrees at Michigan, training in the natural sciences seems to have been more research-oriented than in other fields.

[83] For the faculty's insistence on research, see supra; Angell to Magill, May 3, 1882; *Calendar ... for 1882-83*, pp. 63-65.

[84] Along with the correspondence, faculty debates, and programmatic statements surrounding the origin of the University System, the records of student programs in Records of Registrar give some sense of the aims of the System.

[85] The Hopkins requirements for the Ph.D. in history and political science, for example, retained the German idea of a major field and two minors but insisted that a student's minors both be "akin to his major course." Requirements reprinted in Holt, *Historical Scholarship*, pp. 14-15.

[86] As indeed it had for graduate students in the 1870s. The fields chosen under the University System often fell, not surprisingly, into either scientific or nonscientific triads—like history, political economy, and German, or zoology, geology, and physiology. But combinations like Greek, philosophy, and physics were not unheard of.

[87] Frieze, *President's Report, for ... 1881*, pp. 2-3.

[88] See, e.g., Adams to J. T. Moore, February 2, 1882, and Moore to Adams, February 7, 1882, in Charles Kendall Adams Papers, Michigan Historical Collections. Bert James Loewenberg notes how this attitude distinguished Adams from the "scientific historians" like Herbert Baxter Adams: *American History in American Thought: Christopher Columbus to Henry Adams* (New York, N.Y.: Cornell University Press, 1972), 468.

[89] *The University [of Michigan] Record*, 2 (1892): 58-59.

[90] In a cryptic note in the University System records, in Records of Registrar, Adams complained that the School of Political Science "entered the Dark Ages June 24, 1883. The Renaissance has not yet come." What this means remains obscure, but an important part of the story may never come to light.

[91] No more than thirteen undergraduates ever took degrees on the University System in any one year; by the end of the 'eighties, the number had dwindled to three or four annually. Most of the few students came, in fact, from Adams's School of Political Science. When Adams departed for Cornell in 1885, that trickle soon dried up. These data are compiled from the *President's Reports* and the (incomplete) records of examinations under the University System in Records of Registrar.

[92] See Angell, *President's Reports*. For numbers of graduate students, see *University Record*, 2 (1892): 78.

[93] Angell, *President's Report ... 1892*, pp. 13-15.

[94] See, e.g., *University Record*, 1 (1891) and 2 (1892): *passim*.

[95] See *Announcement of the Graduate School 1892-93* (Ann Arbor, 1892), pp. 14-38, and subsequent years.

[96] *Calendar ... 1893-94*, pp. 119-20.

[97] Likewise, "the most important work of the university professor, ideally considered, is the advancement of science. His calling is to work on the frontier and his best work will necessarily be done with a few students who are themselves preparing to be investigators." *University Record*, 2 (1892): 79.

[98] See, e.g., *University Record* 2 (1892): 2-3; *Announcement of the Graduate School 1892-93*, p. 13.

[99] This is not to deny the obvious fact that the theory, as well as practice, of applied skills formed part of the curriculum of these professional schools. We refer advisedly to "divinity schools" (with their pastoral emphasis) rather than theology faculties, since theology has commonly been construed as "pure" rather than "applied" knowledge. Theology faculties, of hoary antiquity, in their practice also come closer, perhaps, than any other academic entities to Tappan's ideal of advanced but broadly integrated education. Our hunch is that their marginal relation to modern knowledge—put differently, their old-fashioned form of knowledge—helps to explain this.

[100] To say that German example was persistently influential in this half-century is, of course, neither to deny that it had its ups and downs in every institution nor to claim that there was no institution with a secular trend of rise or decline. *Cf.* Hawkins, *Pioneer*; *idem*, *Between Harvard and America*; Bishop, *Cornell*; Louise L. Stevenson, *Scholarly Means to Evangelical Ends: The New Haven Scholars and the Transformation of Higher Learning in America, 1830-1890* (Baltimore, Md.: Johns Hopkins University Press, 1986); and Veysey, *American University*.

[101] Rejection was not necessarily deliberate. How well Americans, even those who studied in Germany, understood the German system is still very much an open question.

THE CHINESE SCHOLARS AND THE MODERN UNIVERSITY: THE APPROPRIATION OF FOREIGN EDUCATIONAL MODELS, 1900-1930

XIAOQING DIANA CHEN[1]

For over a thousand years Chinese scholars were obligated to pass through the gateway of Confucian-based imperial examinations, but at the dawn of the twentieth century, due to the recent introduction of Western learning, they found themselves with an opportunity to acquire intellectual independence. Contemporary educational models from Japan, France, Germany, and the United States were introduced after 1900, at a time when modern schools from primary through university level were established throughout China. Educational initiatives were a vital part of the Ching (Manchu) Dynasty's (1644-1912) eleventh-hour efforts to reform the Chinese government and economy after military defeats on Chinese territory at the hands of Britain, France, the United States, and the rising Asian power, Japan.

Despite the Chinese state's wish that Western learning be applied only to practical matters in China and, as such, remain subordinate to Confucian learning, translations of Western writings abounded. Western authors—from the Enlightenment (Montesquieu, Voltaire, Rousseau), the nineteenth century (Herbert Spencer, Auguste Comte, J. S. Mill), or contemporary academics (Wilhelm Wundt, John Dewey)—found a wide readership. Western ideas avidly introduced by Chinese scholars often conflicted with one another and competed for an audience in China, as various groups of scholars championed different views. It was a time when the most conservative Chinese scholars often had to defend Chinese culture with Western ideas such as evolution, and when many of them decided Confucianism alone was an inadequate basis for Chinese learning.[2] Western intellectual influence was augmented by Western funding of many Chinese projects, including the paleontological excavations funded by the Rockefeller Foundation in the 1920s;[3] the agronomy program at Jinling University funded by Cornell University in the 1920s;[4] the establishment of the Qinghua College to prepare Chinese students for study in America; and the China Foundation for the Promotion of Education and Culture with Columbia professor Paul Monroe on its Board of Trustees. This influx of Western learning threatened to undermine the state's monopoly over intellectual authority, previously made possible through the imperial examination system.

Western learning was first sought by the Chinese state in the wake of the suppression, in 1900, of a popular uprising and the consequent destruction of Beijing, the Chinese capital, by six European countries (Britain, France, Italy, Belgium, Holland, Russia), Japan, and the United States. After the West proved its superiority in military and economic power, the empress dowager, who had opposed reform in 1898, asked for educational and political reforms in 1902. The ineffectiveness of Chinese government also led to wide-ranging questioning of Confucian learning as the pillar of Chinese bureaucracy by scholars both in and out of government. Traditional Confucian learning, particularly the cultivation of character, was a basic requirement for government officials because political rule had long been linked to personal moral example. This combination of moral, intellectual, and political authority was institutionalized in the imperial examination system from the twelfth century to 1905.[5] After 1900, many Chinese scholars, even the most conservative ones, advocated a more spontaneous interpretation of Confucian learning that did not adhere to the interpretations stipulated by the state. These new interpretations "left undecided the question of what sort of sociopolitical consequences of acts could be allowed to stand as an authentic expression of the moral ideal. The question of authenticity could be decided only by the inner standard of the relevant individuals' experience of commitment [to Confucian learning]."[6] Intellectuals and the state began to drift apart.

Despite the prospect of developing more intellectual independence, Chinese scholars still subsumed their goals largely under the cultural or national objectives of the state. Historians who have studied the redefinitions and reinterpretations of cultural and national goals by early twentieth-century Chinese scholars have been concerned mainly with how those goals were related to Chinese history or Western society.[7] Many of them have noticed, however, a shift of loyalty in the twentieth century from the state to a more abstract idea of the 'nation'—an entity above the ruling regime. This loyalty to the nation asserted a leadership role for scholars that did not depend on state approval.[8] This author argues that the introduction of Western learning provided an alternative center of authority for Chinese scholars that did not always converge with the government's political authority, which enabled scholars to bypass the state in their intellectual agendas for themselves and for society.[9] Traditionally, they derived intellectual authority from the state by passing the imperial examinations, thus conforming to state definitions of knowledge. Now, however, their intellectual authority could be derived from the transmission of Western learning. Despite periodic government suppression of the spread of radical Western ideas in the 1920s and 1930s,[10] scholars in the early twentieth century were free to transmit Western ideas. Chinese scholars actively participated in the organization and definition of knowledge, in part by forming numerous professional associations—in geology, pharmacology, chemical engineering, medicine, psychology, astronomy, paleontology, physics, chemistry, mathematics, and electrical engineering. In many cases, Western knowledge became an end in itself, to be mastered irrespective of any direct relevance to the nation. Once the West established a powerful presence in China, the Chinese state was unable to control access to Western learning or the authority that was associated with it. This consequently allowed Chinese scholars to distance themselves from the intellectual control of the state.

But Chinese scholars were not content merely to assume a new, and more autonomous, academic role. They also sought greater social and political relevance, and they did so by associating Western knowledge with Chinese national goals. With Western learning, they found themselves in a much better position to influence state policies. For that very reason, they could no longer completely identify their intellectual authority with the political authority of the state. They became contenders for authority, especially when they disagreed with the state over political and intellectual matters.

The following discussion of the successive introduction of Japanese, French, German, and American educational models shows how Chinese scholars and their colleagues in the government made use of various interpretations of Chinese national goals in order to assert leadership in social and political matters, as well as intellectual affairs. The starting point was the increased difficulty of the state in maintaining the traditional line between intellectual and political authority. Chinese scholars built their authority through the interpretation of Western and Chinese learning as the state yielded its previous authority. Scholars further strengthened their position by allying with the national cause. Attempts by scholars to base their authority in society rather than in the state finally contradicted the lingering faith in the power of political over social authority.

THE COMING OF THE WEST AND CHANGES IN STATE/SCHOLAR RELATIONSHIPS

In Chinese history, the term "scholar" referred to people tutored in Confucian learning and prepared for a life of public service. Prior to the coming of the West in the mid-nineteenth century, an identification with the state was the norm among scholars because they usually considered the pursuit of public office as the goal of learning. Recognition of their Confucian learning was accorded through success in the imperial examinations. The state promoted an ideology based on Confucian self-cultivation of character. "Cultivation, once it had taken root in character, led to a power that could, in turn, 'regulate the family,' 'properly govern the state,' and finally, 'bring peace under all of heaven.'"[11] Connection between office and learning was institutionalized in the imperial examinations. Proclaimed to be a meritocratic selection of government officials, the imperial examinations nonetheless gave the state the exclusive power of deciding which intellectual traditions should be incorporated. Those who succeeded in the examinations would thus be considered well-cultivated men, eminently qualified to assume office. In the fifteenth and sixteenth centuries, quite a few of them staffed the position of prime minister. Other candidates became governors, imperial tutors, imperial compilers, and historians. The last three categories of officials drafted imperial memorials, wrote imperial histories, and set the topics for the imperial examinations to recruit state officials, all along lines set by the state. Despite the fact that they could not decide the content of learning, the scholars working for the state enjoyed political authority and social respectability. In this sense they were the Chinese intelligentsia.

Alternative schools of thought or diverse interpretations of Confucian learning did exist, but because they did not conform to the official interpretations, they could attain neither social status nor nationwide influence. The official interpretations of Confucian learning became the most important learning for all ambitious Chinese who wanted to better themselves through education. This integration of intellectual and political authority, however, was shattered by the intrusion of the West in the mid-nineteenth century. The demand for Western learning led to the establishment of many modern Chinese schools. Between 1895 and 1905, more than one hundred professional or liberal arts secondary schools were built in China at the initiative of provincial administrators or gentry. These schools taught a range of subjects from agriculture, silk-worm raising, engineering, or military science to teacher training. In 1898, the emperor mandated that provincial leaders should establish schools at the provincial, county, and prefectural levels, and that all private schools for transmitting Confucian learning be transformed into schools of Chinese and Western learning.[12] The modern schools, with local government patronage, cultivated the wide range of knowledge deemed valuable by local officials and gentry. Although the number of modern schools in China was dwarfed by that in Japan, it was still a drastic change from earlier times, when education was accomplished largely through private tutorials on the Confucian classics.

Western influences shook the political and intellectual foundations of the Chinese state. Unlike the past when scholars could obtain intellectual authority only by following the political authority of the state, the state now allowed scholars greater intellectual initiative. It abolished the imperial examination system in 1905, so that knowledge, at least in theory, no longer had to be certified by the state. The relaxation, in 1904, of state control over the interpretation of Confucian learning was evident in the regulations for the national university, drafted by Zhang Zhidong, one of the leading reform officials of his day. The Imperial Beijing University was the first national university to be created, and was to serve as the example to all national and provincial state universities to come afterward. Its regulations thus characterized the state's attitude toward higher education in general. According to the regulations, the university was compartmentalized into eight divisions, two more than the Imperial Tokyo University, after which it was patterned. The six Japanese divisions were the Humanities, Law, Medicine, Physical Sciences, Agriculture, and Engineering. Two more divisions, Confucian Learning and Commerce, were unique to the Imperial Beijing University curriculum. In the Tokyo University curriculum, Confucian learning was a field of specialization within the Chinese Learning Section in the Humanities Division, and Commerce was within the Commercial Law Section in the Division of Politics and Law.[13] The seemingly incongruous emphasis on both Confucian learning and commerce symbolized the Chinese state's attempt to synthesize traditional Chinese learning and Western learning: Confucius had condemned commerce, assailing the merchants as potential saboteurs of a social order based on an agrarian economy.

In the university curriculum, Confucian learning was stripped of its previously exclusive authority over all aspects of Chinese life. Within the 1904 curriculum of the Confucian Learning Division, there were eleven fields; each comprised only one or a small number of Confucian classics. Students were asked to choose one field of specialization. Each classic was accompanied by an elaborate explanation of how it should be approached, and supplementary courses on ancient Chinese philology were offered so that students could gain further understanding of the Confucian classics through independent study. This was in sharp contrast to previous practices when students had to conform to fixed interpretations of the classics in order to pass the examinations. The emphasis shifted from a mastery of the content of all Confucian classics to interpreting their meaning, which, according to Zhang Zhidong, could be best divined by studying just one or two works. This was obviously a way to shorten the time students had to spend on Confucian studies, as Zhang felt there was not enough time for the students to study all Confucian teachings in addition to Western learning.[14]

A more important reason for encouraging student independence in Confucian learning was the need to reconcile it with Western learning. Majors in Confucian learning had to master a range of Chinese courses as well as Confucianism and Western subjects (history, geography, law, psychology, logic, and sociology).[15] Confucian studies were limited to six hours per week to enable students to take the additional courses. The Chinese state sought instead to inculcate Confucianism at an earlier age through more intensive instruction in Confucian principles at the primary and secondary levels. In the school regulations of 1904, Confucian learning accounted for fourteen out of thirty hours of classes per week for regular primary school, and fourteen out of thirty-six hours per week for advanced primary school (in both cases not counting hours of classes in classical Chinese). In high school the hours were almost equivalent to those devoted to Western studies.

In conclusion, in the face of its weakened political and intellectual status, the Chinese state allowed greater control of the interpretations of knowledge by scholars. It did not intend to relinquish its control of intellectual authority but to co-opt scholars into working for the state instead of rebelling against it. The imperial school regulations, with careful stipulations of the goals and requirements of schools from the primary to the tertiary levels, took place when schools of Western learning were sprouting up in China, thus threatening the formation of autonomous centers of intellectual activity. This co-optation strategy was premised on a traditional Chinese scholar/official's identification with the state, and it would appeal to those scholars who felt that political and intellectual authority should remain with the state. These were the scholars who would agree with Japanese educators on the need to emphasize a Confucian moral education.[16] They would also readily embrace the notion that education was ultimately a tool for political and social transformation. Luo Zhenyu, a Chinese scholar/educator of the early twentieth century, marveled at the Japanese schools' capacity to suffuse society with large numbers of graduates and transform society as a result.[17] The Japanese educational system, with its substantial content of Western learning and deference to Confucian learning, set a useful example of how to make Western learning cohere with the intentions of the state.

THE JAPANESE MODEL: BUILDING A BUREAUCRATIC HIERARCHY OF EDUCATION

In 1895, when the Chinese were defeated by the Japanese navy over Korea, a tributary state to China, the Chinese state began to consider political and educational reforms. By 1904, the Chinese definitely had committed to the Japanese model of education. Japan not only shared a geographical, linguistic, and cultural proximity with China, but also had introduced Western learning thirty years earlier. Japan's military successes over China and over the Russians in Manchuria (1905) further convinced the Chinese that copying the Japanese model was the path to national strength. The Japanese had achieved state control of education between the 1870s and 1890s through a two-tier national educational system: a broad base in primary school education and a narrow peak in higher education. The graduates of state higher education were intended to serve in state bureaucracies. The state high schools and universities enjoyed privileges not shared by private and provincial schools, and readily conformed to the standards set by the state.

The Japanese educational system was largely patterned after the French, which facilitated state control.[18] In the first comprehensive outline of the national school system in 1871, the Japanese Ministry of Education, established that same year, divided Japan into university, middle school, and primary school districts. This structure potentially could contain as many as eight universities, 256 middle schools, and 53,760 primary schools. While more than 20,000 primary schools were hurriedly put in place throughout the country for lower level mass education in the 1870s, only two state universities existed in Japan up to 1910: Tokyo (1877) and Kyoto (1897).[19] The small number of higher education institutions reflected the state's caution against the "evil of too many people harboring hopes of higher education," in the words of Japanese Minister of Education Makino Nobuaki in 1907.[20] To confine the privileges of higher education to a few state universities, the state tightened regulations on founding private middle schools and universities and privileged the state universities over the private ones in draft deferments and exemptions from government licensing examinations.[21] This led to a clearly hierarchical educational system: a high quality state higher education with a limited number of selected students; a lower quality private higher educational system with large numbers of students; and a large number of both state and private elementary educational institutions.[22] Since these elite universities and high schools were not just academic units but also administrative units overseeing the lower levels of state education, state control over national education was assured.

By adopting the French/Japanese educational model, China sought to establish a subservient educational system consistent with its hierarchical administrative structure. The School Regulations promulgated in 1904 laid out a national educational system similar to that in Japan.[23] It specified a national university at the Chinese capital and other educational institutions according to the level of regional administration.

Thus, universities could be established only at the provincial level, and prefectures could establish primary schools. The national university, on the other hand, would be the model upon which the provincial universities were to pattern themselves. The national and provincial universities would also supervise lower levels of education. Thus the state subjected all levels of education to the leadership of the national university, which was under direct state control.

The intent of this regulation was to thwart locally initiated attempts to build institutions of higher learning, and thus to inhibit the spontaneous formation of alternative intellectual centers. After 1898, when the state established the Imperial Beijing University, many provinces in fact had converted local private or public schools into provincial universities without the approval of the central government. These provinces included Shaanxi, Shanxi, Henan, Hubei, Guangdong, Jiangsu, and Zhejiang. The requirement for state planning of provincial universities in the 1904 School Regulations downgraded these provincial universities to high schools in all but Shanxi province. By 1916, only three state universities existed in China: Beijing, Beiyang, and Shanxi, the first being national, the latter two provincial. There were also four private universities, which had to be approved by the Chinese state.[24] Zhang Zhidong, the imperial minister in charge of school regulations, further inhibited local attempts to create universities by stipulating that provincial universities must include at least three of the eight divisions necessary for a national university.[25]

THE GERMAN MODEL: ESTABLISHING A NEW CENTER OF INTELLECTUAL AUTHORITY

The state's wish to prevent the formation of alternative intellectual centers, however, did not effectively stop contenders for authority from interpreting national goals. Inspiration for according greater intellectual authority and higher social status to scholars came from existent Western models, notably the German. By adopting the Japanese educational model in the 1900s, the Chinese were already touched by the German emphasis on academic specialization, which had penetrated Japanese middle schools and universities. The German emphasis on specialization was designed partly to fill the growing demand for professionals in an industrial society, and the Chinese too considered such training as needed for national strengthening.

The imitation of the German model in the 1910s, however, also represented an early step by Chinese scholars as a group to build their own social and intellectual authority through their reinterpretation of the political goal of national salvation. Scholars working in government positions, such as Cai Yuanpei, a prominent scholar and Minister of Education in 1912, connected Western learning with Chinese national salvation. From his position as Minister of Education, Cai directly borrowed the German practice of granting intellectual autonomy to German academics. Autonomy, or *Lehrfreiheit* in the German model, granted university teachers exclusive authority over intellectual matters. The German rhetoric of intellectual autonomy rested on a tacit, mutually beneficial contract between the Germanic states and academics. German unification, many believed, required the building of a German culture superior to that of France to serve as a center of coalition for the German states. Patronage of universities to build a *Kulturstaat*, a combination of power and learning, would supposedly achieve for Germany the moral and intellectual leadership of Europe: "It was in the untrammeled pursuit of truth and the development of the free man that the university was of political importance, for ultimately these were also the goals of the state."[26] German scholars, on the other hand, also would willingly accept state financial and bureaucratic patronage because it enhanced their status.[27]

Cai represented a generation of Chinese scholars who had been trained in traditional education and traditional responsibilities to state and society, but who had started to redefine their goals when they found Chinese learning an insufficient basis for statecraft. Cai won the highest degree of imperial examinations at age 26 and was appointed compiler at the Hanlin Academy, the highest institution of learning in the country. In the 1890s, Cai began promoting modern Western education in his hometown in Zhejiang province. He declined a government scholarship to Japan, and decided to study in Europe, where he would be at the true fount of Western learning. He attended the University of Leipzig between 1908 and 1911, supporting himself by translating German books into Chinese. He studied under Wilhelm Wundt, majoring in psychology and aesthetics.[28] With the overthrow of the last Chinese imperial dynasty and the establishment of a republic in 1912, he went back to China and was appointed Minister of Education. Although Cai would indignantly leave office within three months because he disagreed with the fundamental principles of the Chinese government, the policies he made during his brief tenure remained in effect until 1919.

The Chinese scholar, thanks to Cai, would enjoy even greater social and political authority than his German counterpart, for Cai made him exclusively responsible for the national well-being of the country in the school regulations of 1912. The new republican government was faced with the need for a new ideology to cultivate social cohesion and modern citizenship. Cai hoped to build social cohesion by inculcating a common set of philosophical values. The scientific underpinnings of experimental psychology and aesthetics that he had absorbed from Wilhelm Wundt convinced Cai of the universality of certain aesthetic values. Therefore, the study of psychology and aesthetics became for him the way to cultivate the universal within each individual. He sought to make these subjects indispensable for the training of Chinese citizens.

Cai rooted the goal of Chinese social reconstruction in a philosophical education. In the School Regulations of 1912, his educational goals for all Chinese schools incorporated five areas: ethics, aesthetics, a world outlook, military training, and practical learning. Among the five areas, Cai ruled that the first three determined the latter two; therefore, military training and practical learning depended on ethical studies. Cai used the Kantian dichotomy of the phenomena and the nomina to explain the relationship between training in the former and the development of a world outlook, aesthetics, and ethics. While aesthetics and a world outlook belonged to the world of the nomina, they helped complete ethics of the phenomena, which in turn served as the basis for training in both citizenship and practical trades.[29] Thus the cultivation of good Chinese citizens would start from an education in philosophy.

The goals of national strength and salvation would now be linked with training in a special body of knowledge. Since training in ethics and aesthetics was the basis for an education in citizenship, the scholars who had the privilege to be properly cultivated in ethics and properly developed emotionally and spiritually would chart the moral and social paths as well as the intellectual agenda for the modern Chinese people. To emphasize the primacy of scholars possessing this knowledge, Cai argued for the control of all other subjects by pure learning, exemplified in the arts and sciences. When he became chancellor of Beijing University in 1917, Cai followed the German practice of making the applied divisions, such as agriculture, engineering, medicine, and commerce, into independent universities. He would have abolished the Law Division had he not met with strong opposition from the faculty, and he wanted to keep only the liberal arts divisions of the humanities and physical sciences at Beijing University. He not only emphasized the difference between applied and pure sciences, but also barred his students from directly pursuing a political or practical career after graduation, making study an end in itself. In addition, Cai discouraged the faculty from assuming positions at both the university and in the government by restricting the titles of those who did to lecturer.[30]

In order to effectively guarantee that educational institutions all over the country would adopt this emphasis on cultivation, Cai employed the French/Japanese district system that had been introduced in order to subject national education to greater control by the Ministry of Education. As Minister of Education in 1912, Cai stipulated that the country be divided into six districts of normal high schools: Beijing, Wuchang, Nanjing, Guangzhou, the Northwest, and the Northeast. The existing normal high schools, established by the provinces, would gradually be taken over by the Ministry of Education and closed after the students graduated. This policy struck a blow to provincial educational efforts. Because very few provincial universities existed (two by 1916), the provincial normal high schools were the principal provincial centers of advanced education. Cai's policy, by 1918, caused all but seven provincial normal high schools to cease operation.[31]

What Cai attempted was the subordination of all intellectual life to authority based on pure learning, the realm of the scholar. To prevent a blurring of the intellectual realm with other realms of authority, and to guarantee that the scholars were the only ones who controlled this intellectual authority, Cai drew on the ethos of contemporary German universities, the emphasis on specialization, which had been used by German academics to achieve autonomy from the state. The German academics realized that to achieve real autonomy, they needed to "generate within the profession the unimpeachable moral norms that would make its public voice authoritative," and to achieve an "internal source of credibility." This led to their self-definition through their subject matter and academic specialization.[32] Specialization was cultivated by the universities as they competed with one another, and replaced, in effect, neo-humanistic studies as the source of greatest prestige in the German universities.

For Cai, specialization would strengthen the intellectual authority of Chinese scholars. He utilized specialization differently from the German academics, however. Specialized subjects were not sufficiently developed to become the internal source of credibility for the Chinese scholars. In Cai's curriculum for National Beijing University in 1912, the course of philosophy occupied the center of all fields; specialized courses were scanty. While the content of specialized courses did not interest Cai much, it was the form of specialization, the taxonomy of knowledge, that attracted him.

The taxonomy of knowledge was important because it controlled the definition of knowledge. Since Western knowledge came from the West, and Western and Chinese categorizations of knowledge were historically very different, the appropriation and assimilation of Western knowledge in China would begin from its taxonomy. Classifying university specializations with Western categories could prevent meddling from indigenous sources outside the university. It was in line with safeguarding this intellectual authority that Cai abolished the Confucian Learning Division and merged it with the Humanities Division at the state university level in 1912. On all levels of learning, compulsory courses in Confucian learning were abolished by 1916, signifying an end to the traditional style of state intellectual patronage. Cai also advocated—albeit unsuccessfully—for a Greater College (equivalent to graduate school) at national universities to encourage research by both faculty and students and to confer degrees on students who finished the research requirements.[33]

The centrality of the taxonomy of knowledge in Cai's mind could also be seen in his departmental reorganization of National Beijing University in 1918, when the seven divisions were replaced by eighteen departments. Cai justified his reorganization on the grounds that it complemented the elective system he had just introduced, which allowed students to choose one-third of their courses. He argued that breaking the divisions down into departments was more conducive to the flexible integration of knowledge through course combinations selected by students. Cai even took this as a way to further his humanistic studies of integrated knowledge. Instead of coordinating their curricula, however, the various departments worked out their required courses individually. Despite their greater freedom to elect courses, the students were trained to be guardians of knowledge rather than, as in Germany, researchers expanding the realm of knowledge. This was Cai's attitude too: Specialization was a means for guarding knowledge from appropriation rather than utilizing it for intellectual discovery.

By championing two facets of German universities, neo-humanistic studies[34] and specialization, Cai built a rationale for the intellectual autonomy of Chinese scholars. Imitating the Prussian state, Cai used his position in the government to make the studies of the Chinese scholar fundamental to the national cause. He furthered their authority through a Western-style taxonomy of both Chinese and Western learning: Knowledge, including that relevant to Chinese national causes, ultimately came from the West, hence its mastery had to depend on its transmission by those scholars who had exclusive control of Western learning in China.

The intellectual base Cai built for the Chinese scholar, however, proved too narrow. Many were excluded because they taught applied rather than pure knowledge, often at institutions below the university level. By 1916, only three state universities existed in China, plus four private ones. At this juncture, the example of American educational system began to turn more Chinese scholars into university academics, thus expanding their social base. Furthermore, American influence enabled Chinese scholars to rely less on state patronage than was possible under Cai's policies.

THE AMERICAN EDUCATIONAL MODEL: BUILDING GREATER SOCIAL CREDIBILITY

The authority of the Chinese scholar under Cai's definition depended largely on state patronage because its foundation in esoteric or pure knowledge could be made relevant to a national cause only by the state. However, the first two decades of the twentieth century saw great instability within the Chinese state. Cai, disillusioned after only three months in office, resigned and retreated to Europe. Beijing then saw an aborted attempt at the revival of monarchy in 1915, and a rapid succession of governments from 1916 to 1928. The presidents of the Beijing governments were either regional warlords or supported by them. Despite the facade of a constitutional government, furnished with representative assemblies, these governments had only limited control of China and had little interest in supporting education. The adoption of an American-style educational system in 1922 by the Beijing government's Ministry of Education, endorsed by national educational associations, coincided with the period when the Beijing government tightened its budget on schools from the primary to the tertiary levels. State university professors in Beijing, during the worst period, received only four or five months' salary in a year. Protests were answered with police clubs. Many professors left Beijing for better-paying jobs in the south.

The American educational system, rooting authority in service to society, not only supplied a good rationale for Chinese scholars to appropriate the symbolic authority of the state—purportedly a republican government concerned with its people—but also helped them to find alternatives to state support. Their authority would now come from service to society rather than esoteric knowledge. Chinese scholars began to call for a revision of the fundamental goals of education that had been set by Cai in 1912, and for a direct linkage of education to society. In 1919, at the meeting of the Educational Research Society (*jiayu diaochahui*) composed largely of members of the Ministry of Education and prominent outside educators, the goals of education were formulated as training in citizenship, cultivating character, and fostering the republican spirit. The military aspect of citizenship training in Cai's 1912 educational goals was denounced for its Teutonic derivation. It would be replaced by an Anglo-Saxon emphasis on human development represented in British and especially American education. Cai's emphasis on ethics and aesthetics was replaced by the development of "basic skills in life." The view of the Educational Research Society was echoed immediately by the

National Association of Educational Societies (*quanguo jiaoyuhui lianhehui*) in its petition to the Ministry of Education to abolish Cai's educational goals. The petition called for a child-centered education that would emphasize the full development of the child's potential as well as an inculcation of the republican spirit. The new educational policies—formally promulgated by the Ministry of Education in 1922—emphasized popular education, the development of individuality, and national economy.[35]

The American educational theories, with their emphasis on social relevance and their assumption of harmony between school and society, held the promise for nongovernmental support for the Chinese scholars as an alternative to state patronage. American educational ideas were first introduced in China by Chinese students returning from the United States in the late 1910s. They were spread further through visits to China by such progressive educators as John Dewey, Paul Monroe, and Helen Parkhurst in the late 1910s and early 1920s. John Dewey's educational theory had the greatest impact in China, being widely disseminated partly as a result of his own lectures in China between 1919 and 1921. Arriving in China on the last leg of his East Asian tour in 1919, Dewey was persuaded by his Chinese students to stay longer and conduct a speaking tour. Dewey's lectures, translated by his former Chinese students at Columbia Teachers' College, reached hundreds of thousands of Chinese and were published in numerous education-related journals that had sprung up in China after Dewey's arrival.[36] He captured the imagination of Chinese scholars with the connection he established between education and immediate social experience.

Dewey's emphasis in *Democracy and Education* on the direct equation of education with continual growth and improvement through life presumed the sharing of fundamental values in schools and society. New ideas developed at schools would be applied to society to improve social life. The Chinese' warm embrace and enthusiastic application of Dewey's educational theory assumed a Chinese society receptive to an American-style liberal education. Since the goal of education would be social service rather than the dissemination of knowledge, there was a growing emphasis on how communication could be improved between the educator and educated so that the latter could better be served. It led to an elevated status for education as a discipline of study, and in the development of previous normal high schools into universities: e.g., National Peking Normal University (1923), National Wuchang University (1924), and National Southeastern University (1923). Teacher education emerged beside pure learning or professional education at many state and private universities. The attention to educational methodologies sought to bridge the gap between education and life in China. Applied sciences programs were also widely established in Chinese universities. The geology and mining departments were largely responses to the exploration for coal and other minerals. The engineering departments responded to the growth in construction of roads, railways, canals, and machinery by creating civil, mechanical, electrical, and chemical engineering departments in many universities.[37]

The emphasis on the integration of education and life at the university level, however, could not hide a general lack of interest in popular education. Popular education was largely neglected by the educational system and left to night schools, popular libraries, book stands, and newspaper reading rooms.[38] The only university that committed itself to social education was National Southeastern University. Guo Bingwen, its president, had been a Ph.D. student under John Dewey at Teacher's College, Columbia University. It established a normal school in the southern Chinese village of Xiaozhuang to train teachers for the countryside. A few colleges also emphasized popular education: Jiangsu College of Education, Shangdong Institute of Country Reconstruction, Jiangsu Huangdu Normal College, and Anhui Huangli Normal College.[39] The Deweyan integration of education and life was, ironically, largely implemented by isolated American-educated Chinese scholars such as Tao Xingzhi and James Yen, or the Western-influenced Chinese scholar Liang Shuming, in the remote Chinese countryside, outside of the main educational network.[40] The movement that Yen promoted had to be largely supported by funding from the YMCA and other religious organizations in America, because "neither the government nor the Chinese middle class" could support Yen's village education organization.[41]

The small number of universities and students in China further hindered their social relevance. Under the influence of American educational models, many professional schools or colleges were elevated to the status of the university in the 1920s, but the numbers of universities and university students were still small compared with the national population. By 1925, of the 31 national and provincial universities, only three had more than 1,000 students; two had between 800 and 900 students, while others had enrollments ranging from 1-200 (nine) to 4-600 (four).[42] By 1934, college and university students altogether did not exceed 40,000, while the combined faculty numbered 6,300,[43] compared with a national population around 400 million.

The social relevance symbolized by the curricula in American universities, especially the applied science programs, was used as much to enhance the stature of Chinese universities as to serve social needs. Among the most prestigious Chinese state and private universities, National Qinghua University had a College of Engineering that included departments in civil, municipal, and mechanical engineering. It also had a research institute in agriculture. The Private Fudan University had departments in banking, accounting, civil and municipal engineering, finance, statistics, international trade, agriculture, forestry, tea research, and agricultural chemistry, among others. The Private Nankai University, besides departments in applied learning, also had a research institute in applied chemistry that was aimed at cooperation with the Chinese industrial and business community.

At the same time, the distribution of students across the board could be quite uneven in the same departments at different universities. Forestry departments in 1931, for instance, had five students with three faculty at National Zhongshan University, twenty-six students with six faculty at National Zhongyang University, four students with two faculty at Provincial Henan University, twenty-seven students with four faculty at Private Jinling University. The business department had three students with five faculty at National Zhongshan University, nine students with two faculty at Private

Daxia University, forty-nine students with five faculty at Private Guanghua University, again all in 1931. A similar unevenness of student-teacher ratio characterized the less applied departments such as mathematics, physics, biology, philosophy, and history. On a university-by-university basis, the number of students in departments often called into question the need for some of them. At National Beijing University in 1931, for instance, the biology department had eight faculty members for ten students; the psychology department had seven faculty members and ten students. At National Qinghua University, there were six faculty members for eight students in the sociology department, and six faculty members for six students in the education department. Occasionally, a university would consist of departments with teacher/student ratios of 1:2 or 1:3. The largest department of the Private Jinling University was agriculture, with eleven faculty members and sixty-two students. More typical Jimling departments had four to ten faculty members, with students ranging from four (zoology) to twenty-nine (economics). Even so, the university still boasted nineteen departments.[44]

The taxonomy of knowledge, whether in pure or applied learning, did not correspond with actual social needs at any Chinese university. It seemed to be an important device to bolster the status of the university, which made even the applied sciences departments in certain cases just as socially irrelevant as the esoteric pure knowledge of the past. Applied disciplines were considered relevant by the very fact that they came from American universities. By borrowing the intellectual prestige of the American educational system rather than its purpose, Chinese scholars justified their relevance to Chinese society.

CONCLUSION

The introduction of the French/Japanese, German, and American educational models in China shows that no model was introduced for its own sake. Accordingly, they did not replace one another completely but often co-existed in incomplete form. Once established, the universities often worked at cross-purposes with the government. When a more pervasive education in nationalism was started in the late 1920s by a Nationalist government, bringing greater unity to China, the universities resisted centralized control. They fought against the renewed French university district system, tried out in Jiangsu, Zhejiang, and Beijing by the Nationalist government in 1928, and they forced the government to stop the practice in 1929. In the 1930s, moreover, many universities resisted the Nationalist government's attempts to impose applied learning by reviving Cai's emphasis on programs of esoteric, pure learning. The Nationalist government tightened its requirements on schools eligible to achieve university status. A university had to consist of three colleges or more, one of which had to be science, the other two preferably from agriculture, engineering, or medicine. At least eight national and two provincial universities were disqualified from university status.[45]

Two processes took place in the introduction of those educational models into China: the academic professionalization of Chinese scholars and their attempt to fashion a larger social role. Different views toward how they were to be defined in Chinese society and the criteria for membership in the profession were reflected in the different educational models adopted. On one hand, compared with the early German model, the American educational model was certainly more appealing to Chinese scholars because it provided wider membership and greater equality. On the other hand, its emphasis on social service meant the university academics would rely less on state patronage to build a connection between their work and a national cause. They would now seek connections with society through their own initiatives. Yet, Chinese scholars-turned-academics were never quite comfortable with the idea of becoming merely professionals and deriving their authority solely from social service. Their traditional role as the Chinese intelligentsia, with their unquestioned social and political status, gave them reason to aspire to a more secure and undisputed social status.

Western learning provided a great opportunity for Chinese scholars to improve their status in several ways. It allowed them to define the content of learning, something they had never been able to do when intellectual and political authority were one and the same in the form of Confucian learning. Mastery of Western learning meant not only greater intellectual independence, but also greater opportunity to help define national goals. This was important because, given the small number of intellectuals who existed in China, they were not able to form an influential social group. However, the claim of Chinese scholars that their intellectual attainments entitled them to political authority was seldom disputed because a viable Chinese middle class never actually developed.[46] Chinese professionals remained few in number and were concentrated in the coastal regions of China, where foreign capital investments had created the milieu for modern business. In addition, the government was often unreceptive and even hostile to political and intellectual activities of scholars in the early twentieth century. Western learning provided a stable source of authority for Chinese scholars. Being its transmitters, scholars also felt they were often in a better position than the government to decide what policies were best for the country. Even when they worked in the government, they were conscious of the fact that they had a separate source of intellectual authority, because their alliance with the state was only conditional, and often transient, whereas they believed that their political and intellectual authority transcended their positions in the government. They carefully guarded their privilege as transmitters of Western knowledge, as evidenced by their detailed academic taxonomy irrespective of social need or requirements of student specialization. Western knowledge was to be cultivated and preserved rather than developed. Western knowledge encapsulated in the Chinese universities was meaningful and authoritative because the West literally posed an alternative center of politics and culture. Chinese scholars in the early twentieth century charted a course between intellectual independence and social service, and succumbed to the ever-present temptation to expand their intellectual, social, and political authority in China that the mastery of Western learning seemed to promise.

NOTES

[1] The author would like to thank Roger Geiger, Roger Williams, Paul Korn, Robert Church, Richard Rubinger, and an anonymous reader for helpful questions, critique, and editorial improvement. This paper would not have been possible without the help of my husband, Ling Lin.

[2] Charlotte Furth, ed., *The Limits of Change: Essays on Conservative Alternatives in Republican China* (Cambridge, Mass.: Harvard University Press, 1976).

[3] See chapter on the excavation of the Peking Man by Mary Bullock, *An American Transplant, the Rockefeller Foundation and Peking Union Medical College* (Berkeley, Calif.: University of California Press, 1981).

[4] Yen Yuanliang, "Zhongguo nongxue fazhan gailue," (A general outline of the development of agricultural studies in China) in Li Ximo, ed., *Zhonghua minguo kexue zhi* (A record of the development of the sciences in China) (Taibei: Zhonghua wenhua chuban shiye, 1955), v. 3.

[5] The Chinese imperial examination system, with an emphasis on Confucian learning, was already in practice as early as the seventh century. But in the twelfth century, the examinations began to be focussed almost exclusively on Confucian learning, and the scope of Confucian readings was narrowed to four volumes in the officially approved anthology compiled by Chu Hsi.

[6] Charlotte Furth, "Culture and Politics in Modern Chinese Conservatism," in Charlotte Furth, ed., *The Limits of Change: Essays on Conservative Alternatives in Republican China* (Cambridge, Mass.: Harvard University Press, 1976), 43-44.

[7] For the Chinese scholars' interpretations of the goals of nationalism or culturalism, see, for instance, Benjamin Schwartz, *In Search of Wealth and Power: Yen Fu and the West* (Cambridge, Mass.: Harvard University Press, 1964). Laurence Schneider, *Ku Chieh-kang and China's New History* (Berkeley, Calif.: University of California Press, 1971). Charles Hayford, *To the People: James Yen and Village China* (New York, N.Y.: Columbia University Press, 1990). James Pusey, *China and Charles Darwin* (Cambridge, Mass.: Harvard University Press, 1983). D. W. Y. Kwok, *Scientism in Chinese Thought 1900-1950* (New Haven, Conn.: Yale University Press, 1965). Arif Dirlik, *Anarchism and the Chinese Revolution* (Berkeley, Calif.: University of California Press, 1991). David Arkush, *Fei Xiaotong and Sociology in Revolutionary China* (Cambridge, Mass.: Fairbank East Asian Research Center, 1981). Marianne Bastid, "Servitude or Liberation? The Introduction of Foreign Educational Practices and Systems to China from 1840 to the Present," in Ruth Hayhoe and Marianne Bastid, eds., *China's Education and the Industrialized World, Studies in Cultural Transfer* (Armonk, N.Y.: M. E. Sharpe, 1987), 3-20.

[8] See, for instance, Charlotte Furth, *Ting Wen-chiang: Science and China's New Culture* (Cambridge, Mass.: Harvard University Press, 1970).

[9] For an illustration of the battles between the intellectual authority of Western learning and political authority of the Chinese state, see Wen-hsin Yeh, *Alienated Academy: Culture and Politics in Republican China, 1919-37* (Cambridge, Mass.: Harvard University Press, 1990).

[10] Yeh Wen-hsin, *Alienated Academy: Culture and Politics in Republican China, 1917-37* (Cambridge, Mass.: Harvard University Press, 1990).

[11] Perry Link, "China's 'Core' Problem," in *Daedalus* 122 (2) (Spring 1993):192.

[12] Chen Xuexun, ed., *Zhongguo jindaijiaoyu dashiji* (Shanghai: Shanghai jiaoyu, 1980), 63-144.

[13] Zhang Zhidong, et al., *Zouding gaodeng xuetang zhangcheng* (The [imperially] approved regulations of higher education), in *Zhongguo jindai jiaoyushiliaohuibian, xuezhi yanbian* (Collection of the historical documents on modern Chinese education: the evolution of the educational system) (Shanghai: Shanghai jiaoyu, 1991), 340.

[14] Zhang Zhidong, et.al., *Zouding daxuetang zhangcheng* (University regulations), and Zhang Zhidong, "Zhi jingguanli daxuetang zhangshangshu," (Letter to Zhang Baixi, supervisor of Peking University), in *Zhongguo jindai jiaoyushiliao huibian*, 341-346, 133.

[15] Zhang Zhidong, *Zouding daxuetang zhangcheng*, 345.

[16] Luo Zhenyu, "Fusangliangyue ji," (My two months' stay in Japan) in *Zhongguo jindai jiaoyushiliao huibian*, 118.

[17] Luo Zhenyu, "Fusang liangyueji," 119.

[18] See Joseph Ben-David's discussion of the French higher education in his *Centers of Learning: Britain, France, Germany, and the United States* (New York, N.Y.: McGraw Hill, 1977).

[19] Richard Rubinger, "Education, from One Room to One System," in Marius Jansen and Gilbert Rozman, eds., *Japan in Transition: From Tokugawa to Meiji* (Princeton, N.J.: Princeton University Press, 1986), 207-218.

[20] Carol Gluck, *Japan's Modern Myths: Ideology in the Late Meiji Period* (Princeton, N.J.: Princeton University Press, 1985), 104.

[21] *Ibid.*, 221-225.

[22] *Ibid.*, 227.

[23] Hiroshi Abe, "Borrowing from Japan: China's First Modern Educational System," in Ruth Hayhoe and Marianne Bastid, eds., *China's Education and the Industrialised World: Studies in Cultural Transfer* (Armonk, N.Y.: M.E. Sharpe, 1987), 63-64.

[24] *Diyici zhongguo jiaoyunianjian* (The first Chinese educational annual) (Taibei: Zhuanji wenxue, 1971), 2:335, 338.

[25] *Diyici zhongguo jiaoyu nianjian*, 2:334.

[26] John Craig, *Scholarship and Nation Building: The Universities of Strasbourg and Alsatian Society, 1870-1939* (Chicago, Ill.: The University of Chicago Press, 1984), 13.

[27] Anthony La Vopa, "Specialists Against Specialization: Hellenism as Professional Ideology in German Classical Studies," in Jeffrey Cocks and Konrad Jarausch, eds., *German Professions: 1800-1950* (New York, N.Y., and Oxford, England: Oxford University Press, 1990), 34.

[28] See Xiaoqing Diana Chen, *Curricula Development and Academic Professionalization at Peking University, 1898-1937* (Ph.D. diss., University of Chicago, History Department, 1993), chap. 3.

[29] Cai Yuanpei, "Dui jiaoyuzhiyijian," (My views on education) in *Zhongguo jindai jiaoyushiziliao huibian*, 608-613; Cai Yuanpei, talk at the First National Conference on Education of the Republic of China (July 1912), Zhongguo jindai jiaoyushi ziliao huibian, 638-639.

[30] *Ibid.*, 817-827.

[31] *Diyici zhongguo jiaoyu nianjian*, 2:470.

[32] *Ibid.*

[33] *Zhongguo jindai jiaoyushi ziliao huibian*, 651-2, 663, 698, 711. In the late 1910s and especially the 1920s, research institutes in the humanities and sciences were established at Beijing University and three or four other universities. They did not always confer degrees on students. In Beijing University, for instance, the student would complete his work at an institute with either a research paper or translation of a foreign work, without a formal convocation or a graduate degree. On the whole, these research institutes had few students.

[34] La Vopa, "Specialists Against Specialization."

[35] *Diyici zhongguo jiaoyunianjian*, 1:36-7.

[36] Barry Keenan, *The Dewey Experiment in China: Educational Reform and Political Power in the Early Republic* (Cambridge, Mass.: Harvard University Press, 1977), 30.

[37] For a discussion of the development in civil, mechanical, chemical, and electrical engineering in China, see Section 4, "Engineering science," in Li Ximou, ed., *Zhonghua minguo kexuezhi* (A record of the development of science in the Republic of China) (Taibei: Zhonghua wenhua chubanshiye, 1955), v. 2.

[38] Zhuang Zexuan, "Zhongguo zhichengren jiaoyu," (Adult education in China) in Shu Xincheng, ed., *Zhongguo xinjiaoyu gaikuang* (Overview of China's new education), 186-196.

[39] Cui Zaiyang, "Jiaoyu xue," (The study of education) in Li Ximou, *Zhonghua minguo kexuezhi*, v. 1.

[40] See Charles Hayford, *To the People: James Yen and Village China* (New York, N.Y.: Columbia University Press, 1990). Keenan, *Dewey Experiment*, 82-93. Guy Alitto, *The Last Confucian: Liang Shu-ming and the Chinese Dilemma of Modernity* (Berkeley, Calif.: University of California Press, 1979).

[41] Hayford, *To the People*, 77.

[42] *Diyici zhongguo jiaoyu nianjian*, 2:340.

[43] *Diyici zhongguo jiaoyu nianjian*, 2:325.

[44] *Diyici zhongguo jiaoyu nianjian* (The first Chinese education annual), 2:351-446.

[45] The Nationalist Ministry of Education, dropped the requirement of both colleges of arts and sciences as the condition for a university, but among state universities in 1931 only one did not have both colleges.

[46] See, for instance, Fritz Ringer's discussion of the decline of German scholars' influence in the government as a result of the development of professionals in society: industrialists, businessmen, engineers, among others. Fritz Ringer, *The Decline of the German Mandarins: The German Academic Community: 1890-1933* (Cambridge, Mass.: Harvard University Press, 1969).

RETROSPECTIVE ESSAY

Nathan Glazer's "Schools of the Minor Professions" and the Evolution of Education, Business, and Journalism in American Universities[1]

PATRICIA L. GREGG

In 1974, Nathan Glazer offered a new perspective on a part of higher education that was relatively neglected by scholars, particularly historians: schools for the minor professions. "Science and higher education," Glazer observed, "have become indispensable to the dignity of these new occupations which deal with social tasks." American universities, which had undertaken the training of teachers, social workers, journalists, library administrators, and other similar occupations, were held up to the world's more traditional educational systems as a model for "ways in which universities could adapt themselves to the needs of an affluent, 'science-based' society concerned for the welfare of all its members."[2]

Glazer defined the minor professions as new occupations, hoping to elevate their status to equality with the "learned" or major professions of medicine and law. He chose schools of education, social work, town planning and divinity to illustrate the conflicts that characterize the schools of the minor professions. The same tensions were not generally evident in graduate schools of arts and sciences, the schools of the major professions, or the schools of the "science-based" minor professions such as optometry, dentistry, engineering, or architecture.[3] Glazer did not consider schools of business and journalism, primarily because degrees from these schools did not control access to professional occupations; but in other respects, they largely resemble the minor professions.

This essay considers recent contributions to the history of schools of education, business, and journalism from the framework offered in Glazer's analysis. In American higher education these schools are anything but 'minor.' In recent years they have granted nearly 40 percent of bachelor's degrees and more than half of all master's degrees.[4] Yet, attention in the historiography of higher education has been scarcely commensurate. Historical writing on these schools has been fragmented in purpose, fugitive in locus, and uneven in quality. Historical monographs on this topic are few and far between. Dissertations may be more numerous, but are seldom developed into substantial contributions. Given this sparseness, institutional histories have considerable value, despite their restricted purview. Finally, the history of these schools is most often invoked to assess or advocate positions about the present state or future goals of education for the professions. Glazer's framework is built around basic conflicts that arise from four main sources: discipline-based scholars teaching prospective practitioners; status differentials among the professional roles for which students prepared; the standing of academic disciplines being higher than that of the professions; and instability in the content of accepted professional knowledge.

1) *Conflicts associated with scholars teaching practitioners.* According to Glazer,the conflict between scholars and practitioners that arises occasionally in the major professional schools is inherent to the schools of the *minor professions*. One certain sign of this conflict is the high proportion of scholars/researchers to practitioners on the faculty. Disciplinary faculty approach the subject from a theoretical perspective, and may neglect or actually disdain concerns of everyday practice that loom large in the lives of would-be professionals.

2) *Status differentials in professional roles.* Glazer observes that within the minor professions, administrators of practitioners are generally superior in status to the practitioners themselves. For example, the school principals or guidance counsellors are held in higher regard and better remunerated than teachers. In the major professions of law and medicine, administration affords no status advantage over practice, and professional experience actually adds to the prestige of professional school faculty. By contrast, teachers in the schools of the minor professions derive no advantage from experience in practice.

   The status differences in professional roles lead to commensurate status differences in the professional schools. Professional school faculty are more highly regarded than practitioners of the field. Where formalized study of administration as a career exists, as in education, social work, or nursing, such study will outrank preparation for the central professional role. Sub-professional specialties, such as guidance and counselling, will also acquire superior status. Consequently, teachers of the minor professions (whether originally trained themselves as practitioners or as academics) "gravitate towards teaching the higher administrator, the research worker and potential teacher in the professional school—all roles with higher status—and tend to neglect teaching and training for the central role of practitioner."[5]

3) *Conflicts occurring when disciplines outrank the profession.* Glazer asserts that "the status of academic disciplines in minor professional schools is superior to that of the profession, to the education of which they are to contribute."[6] Faculty members with doctorates in social science disciplines such as political science, anthropology, or sociology will be more highly regarded than those with doctorates in professional fields such as education, social work, or town planning. This conflict is linked with those already discussed; the academic training of faculty, and the criteria on which they are appointed and evaluated, are only loosely related to the professional practice for which they are preparing students. One way of coping with this situation mentioned by Glazer was to cultivate research in multidisciplinary research institutes. An alternate response is to "sternly set one's nose to the grindstone" and elevate the intellectual demands of the professional degrees

to equivalence with those of the academic disciplines. According to Glazer, the difficulty of the latter approach renders it unattractive; moreover, such efforts will likely fail due to the final source of conflict, "rapid and upsetting changes in accepted and fundamental professional knowledge."[7]

4) *Conflicts created by instability of the knowledge base.* Glazer argues that the pattern of professional training for medicine and law has changed "surprising little" in sixty years, a time frame that exceeds the entire history of some of the minor professions. In contrast, minor professions "never seem to be long secure in their adoption of any curriculum and mode of training, and they undertake 'radical revolutions' every decade or so."[8] The type of conflict was particularly evident at the time Glazer wrote, after the far-reaching and fundamental changes undergone by the "helping" professions in the United States during the 1960s. The impact of these changes was so dramatic that the course content, academic and scholarly orientation, criteria for faculty appointments, and characteristics of the student body of a professional school in the early 1970s might be unrecognizable from those of the same institution ten years earlier. The extent to which such conditions are inherent to the minor professions is an important but difficult question. As applied social science, they draw upon the multiple, conflicting paradigms of the social sciences themselves. In addition, application in professional practice can raise the problem of contested social goals. Change or conflict over the knowledge base thus bears monitoring as a critical feature of education for the minor professions.

EDUCATION

Colleges of Education seem to exhibit the four conflicts of minor professions in starkest form. Jurgen Herbst's history of teacher education locates the genesis of this problem in the very evolution of teacher training from normal schools to state teachers' colleges to professional schools within comprehensive state universities. He argues that in the late nineteenth century teacher educators "followed the siren song of the professionalizers." By the 1920s, the graduate departments of education had betrayed the cause of teacher professionalism by "exchang[ing] their original purpose of educating classroom teachers for the more prestigious tasks of training specialists and administrators."[9]

The market and social conditions supporting the ambitions of schools of education during the first decades of the twentieth century have been portrayed by Geraldine Jonçich Clifford and James Guthrie. Attempts by school systems to cope with the "bewildering profusion" of political, cultural, and technological changes caused the growth rate for administrators and managers to exceed that of teachers. The role of the head teacher evolved into the school principal, and became increasingly defined by special training. The "new educational bureaucrats" became professionalized: "with proper study *they* could tell teachers how to perform, apply the rules, and then supervise their work." Schools became increasingly complex institutions, creating a need for middle-management positions, just as in business corporations. Urban schools, especially, were adding services like academic counseling, vocational guidance, school libraries, and special programs in nutrition, recreation, and health.[10]

Issues of gender bias exacerbated the growing status differential between teaching and administration. Teaching was women's work; managing was men's: "male teachers who stayed too long in the classroom—in the regular company of women and children—might even raise doubts about their manliness and, therefore, their suitability for dealing with the local power brokers on school boards and in chambers of commerce."[11] Herbst too noted that "the schools of education of the universities relegated the education of secondary school teachers—if they continued it at all—to their undergraduate departments. They reserved their graduate-degree work to entice the largely male candidates into programs in educational administration, educational psychology, educational journalism, and college or normal school teaching. Professionalization became a nearly uniformly male preserve."[12]

Graduate training appeared earlier in the field of education than in most other professions. The first education "majors" at Stanford included three graduate students; Minnesota offered pedagogy as a subject for graduate study in 1893; and Berkeley awarded the nation's first Ph.D. in education in 1897, six years after the initial faculty appointment in pedagogy. By 1897, two exclusively graduate courses were available at Iowa: "one featured statistical and descriptive studies of public school conditions, the other Herbartian methods in German elementary schools—both 'trendy' subjects at the time." In 1898, thirteen advanced courses were available at Teachers College, including graduate study in foreign school systems (requiring a reading knowledge of both French and German) and school supervision and school management (taught by the superintendent of the Newark, New Jersey, public schools). In 1910, when a total of thirteen Ph.D. degrees in education were awarded nationally, Teachers College enrolled sixty-two doctoral students.[13]

Harvard's Graduate School of Education began as a division within the faculty of arts and sciences, where it remained until 1920. In 1891, its only serious competition for university-level instruction in pedagogy came from Clark and NYU. By the end of the decade, however, the University of Chicago and Teachers College had overtaken the older institutions as the leaders in the study of education. In the fifteen years prior to 1911, Harvard awarded the A.M. degree in education to a total of sixty-two individuals, and the Ph.D. to only two. From 1912 to 1920, twenty Ph.D.'s were awarded in education.[14]

Graduate study and professionalization in educational administration appropriately turned to research for further legitimacy. Chicago's department of pedagogy under the leadership of John Dewey spearheaded this development in the late 1890s. In contrast with schools designed to train the "rank and file" of teachers, Dewey believed those educating the leaders of education systems should devote themselves more directly to discovery and experimentation. Richard J. Storr explains:

> As a departmental study, pedagogy was hardly more "professional" in its intellectual bearings than philosophy, or the other disciplines taught by the Faculty of arts, literature, and science; inquiry lay at the heart of them all. In Dewey's view, then, philosophy and psychology led into pedagogical research and into the practice of teaching—although not, in a university, to practice-teaching.[15]

Alternatively, a more applied "educational science" was on the rise in Harvard's emerging graduate school. Harvard faculty members were not attempting to train a separate class of researchers but rather hoping to make research skill a professional tool for all responsible school officers. As time progressed, however, increasing attention was devoted to psychological measurement and experimentation. Despite initial expectations, research became associated with specialized careers distinct from teaching and administration.[16]

In schools of education the superiority of the disciplines manifested itself most noticeably in the form of criteria for promotion and tenure, specifically publication in refereed journals, leadership in "recognized" scholarly and scientific societies, and service on campus committees. One outcome, according to Clifford and Guthrie, was the reduction in incentives to engage in teacher education and "other time-consuming field-based activities."[17] Basic research in the disciplinary canons was more likely to be valued by university personnel committees than was applied research and development for "low-status professionals and school children."[18]

Education had some reason for anxiety over its intellectual status, since it was demeaned by the rest of the Academy. Harvard's Graduate School of Education devised a new doctorate of education in 1920 only after "last-ditch efforts" to retain the Ph.D. were rejected by President Lowell. The Division and its doctoral alumni were split "between those who believed new degrees would celebrate the liberation of professionalism from the 'skirts of the philosophical faculty' and those who contended that a new degree given for essentially the same work as the Ph.D was a disastrous professional defeat."[19] At Teachers College, the new professional doctorate in education, designed to be more responsive to the needs of students pursuing administrative careers, was introduced in 1934.[20] By 1941-42, the Ed.D. surpassed the Ph.D. in number of degrees awarded by Teachers College.[21]

The conflicts Glazer found in schools of education in the 1970s thus date back to the origins of university departments of pedagogy. Conflicts associated with status differentials in professional roles have characterized the study of education. University-based teacher training evolved into preparation for careers in educational administration, guidance and counselling, and educational research. Additionally, the study of educational foundations and institutions became an academic specialization in and of itself. Conflicts associated with scholars teaching practitioners, and with status of the academic disciplines outranking status of the profession have historically plagued the field. In addition, Clifford and Guthrie charge that education has pursued three "dysfunctional coping strategies" in dealing with its perceived inferiority to the disciplines: (1) interdisciplinary appeasement, (2) academic intensification, and (3) a search for social science legitimacy. Interdisciplinary appeasement is commonly manifested by joint faculty appointments and joint recruitment, i.e., inviting faculty from other academic fields to participate in the recruitment and selection of education faculty. Academic intensification, a more commonly practiced strategy, is evidenced by two major preferences: One is the students' preference for the academic Ph.D. over the professional doctorate; the second is the faculty's preference for academic-style research over practitioner concerns. The appointment of social scientists as faculty members illustrates the third type of strategic accommodation. According to the authors, all of these strategies have not only failed, but backfired. "In their attempts to compensate for their status-deprived condition, education schools have legitimated, not repudiated it."[22]

Glazer's original observation about rapid changes in the content of professional knowledge may well have been an artifact of the times in which he was writing. Clifford and Guthrie, in fact, believe that change in the knowledge base of education has been glacial. Indeed, once the primary shift from the training of classroom teachers to the preparation of administrators and researchers occurred, university schools of education appear to have changed very little from the 1920s to the 1950s. While the dramatic changes Glazer described certainly did take place in the early 1970s, they have hardly been a decennial occurrence since then. New developments in social research methodology (e.g., naturalistic inquiry, critical theory, postmodernism) have challenged, but not necessarily replaced, the traditional knowledge base. Proposals for radical reformation of teacher education were circulated in the mid-1980s, but no universal agreement exists as to whether the preferred solution is a stronger emphasis on teaching methods or on subject matter competence.[23]

BUSINESS

In its early days, business followed a similar route into the universities as did education. Commercial subjects and office skills like penmanship, typewriting, and bookkeeping were taught in schools at various educational levels, including the collegiate.[24] Professional education for business markedly advanced with the founding of the nation's first formal business school, the Wharton School, at the University of Pennsylvania in 1881. Other universities, even the supposedly utilitarian land-grant institutions, were slow to follow. The opening of colleges of commerce at the Universities of California and Chicago in 1898 brought the total to three by the close of the century. Consistent with Glazer's observations about the superior status of administrators, the academic study of business increasingly emphasized the *administration* of traditional business functions (e.g., accounting, finance, marketing) over the technical skills needed to perform those functions. Describing Chicago's College of Commerce and Administration (announced in 1897-98), Richard Storr observes, "in retrospect it appears that the second term was used, not to designate a distinct subject to be taught in addition to commerce but to indicate that aspect of commerce which made it worthy of academic study."[25]

Ironically, the discipline known as 'Management' *did not* afford prestige to early graduates. The study of management played no significant role in the curriculum of the Wharton School prior to World War I. In the first decades of the twentieth century, most business leaders viewed management in conjunction with a specific industry or function (e.g., railroad or bank management, sales or production management) rather than as a distinct activity in its own right. Most top managers of the time attained their positions either by family connections or length of service to the firm, not as a result of professional skill. They attached little value to academic training or mastery of general management principles.[26]

The founding of the Harvard Graduate School of Business, established in 1908 with an explicit managerial (in the contemporary sense of the term) orientation, thus represented a major departure in business education. In order to cultivate skills of integrated executive judgment, decision making, and leadership, Harvard adopted its famous case method of instruction.[27] According to Steven Sass, Harvard won preeminence in the field of general management while Wharton established its leadership in specialized business studies.[28]

By the 1920s, the curriculum of the nation's oldest business school reflected the emerging status of management as a sub-professional specialty (or indeed as a profession in its own right). Sass describes the school's developing program in management as "schizophrenic." The faculty continued to prepare students for specialized technical careers, but these "young doctors of industry" saw themselves as part of a much more broadly encompassing enterprise.[29] To illustrate this point, he cites a Wharton professor of industry:

> Executives have come to talk management, periodicals have come to talk management, and the general public is beginning to realize that in the force of management lies the path to better understanding of industrial problems and through that to better community life.[30]

Over the next several decades, however, business schools, and particularly graduate schools, were frequently criticized for being too narrowly focused, and lagging behind business practice.[31] To support the enrichment of management education, in 1953 the

Ford Foundation undertook a program of grants designed to revolutionize business education. The curricular and instructional innovations developed with Ford support at Carnegie Tech, Harvard, Columbia, Chicago, and Stanford ultimately achieved widespread dissemination as the "New Look," favoring graduate education, decreasing specialization, and greater emphasis on the behavioral sciences, quantitative techniques, and case analysis. Although the number of colleges offering undergraduate business courses grew between 1955 and 1965, the two-year master's degree designed for liberal arts graduates became an increasingly important component of business administration programs. Undergraduate offerings were abolished altogether at "a handful of elite-aspiring institutions," notably UCLA and Northwestern. Most schools without master's degree programs planned to add them within five years; substantial growth also occurred in the numbers of doctoral programs. Above all, the most far-reaching research and curricular change attributed to the Ford grants was the "triumph of quantification," reflected in increasing requirements for mathematics courses.[32]

Thus, by the mid-1960s, the field of "management" in business school curricula had come to be associated with courses in personnel, industrial relations, organizational theory, and/or production/operations management.[33] The broader context of management, on the other hand, began to insinuate itself into each of the other functional specialties (or business disciplines). According to one graduate business dean, the emphasis in accounting and statistics increasingly favored their use as tools for managerial decision making. Marketing and finance also reflected an increasingly managerial orientation, with marketing demonstrating "a more systematic endeavor to relate analysis to the behavioral sciences and to use mathematical models."[34]

Business schools have increasingly created a separate tradition of scholarship. Sass describes the emergence of the new "policy sciences," developed at Wharton in the 1960s, which were much more academic than the business disciplines that had originated in the school at the turn of the century. Doctoral students typically took three to six years to earn their degrees, two or three times longer than those in 1900, with far more rigorous requirements in mathematics, theory, and research.

> Wharton's pioneer business professors, as could be expected, had found most of their curricular materials in the business world, not in the university. Despite their energy and enthusiasm, their scholarship had essentially been an extended form of business journalism. The new policy scientists, however, took their basic materials from academe. They substituted theoretical models for institutional description; behavioral theories for legal prescription; and abstract rationality for standard procedure. In doing so, they created whole fields of knowledge and practice that were new to the business scene. But since these policy sciences proved themselves to be potent managerial instruments, they quickly found a place in the world of affairs.[35]

By the 1980s, the academic study of business seemed to some to have become largely divorced from praxis. Robert Locke contrasts managerial jobs with those in engineering, arguing that a greater proportion of skill (gained through experience) as opposed to knowledge (gained through formal study) is needed by managers. Consequently, business firms are more likely to seek technical assistance from the engineering professoriate than management assistance from business school academics. Unlike the engineering researcher whose scientific experimentation will inform business practice, "[t]he business academic is an outsider who is trying to find out what is going on inside the firm. That is why so much business school research takes the form of case studies, participative projects, and surveys."[36]

Although a gap between scholars and practitioners exists in schools of business, their development has fostered a set of conditions almost exactly the opposite of those that contribute to status-deprivation in schools of education. Pursuit of 'academic intensification' has not been a dysfunctional strategy for these schools, but has been a successful route to status enhancement. Interdisciplinary appointments are not 'appeasements' to attract high-quality faculty from other fields, but rather prizes for those seeking association with the high-status (and high-paying) business school. Social science may have been used as a route to legitimacy for a brief period in the history of management education, but has since been superseded by its own body of organization and systems theories.

Glazer originally excepted from his analysis the 'quasi-professional' school of business, "which seems to have established a somewhat secure pattern of training." He speculated that the unalloyed pursuit of profit afforded greater stability.[37] While trends in management education have shifted more gradually than those described by Glazer in the other social professions, some major changes have occurred: the increase of women both as students and faculty; curricular revisions reflecting more quantitative and managerial orientations; the growing importance of graduate education; and changing emphases on instructional techniques such as case analysis and group projects.[38] These patterns, however, do not necessarily refute Glazer's thesis, but may actually support it. As the mission of business education becomes more ambiguous, including broader societal goals and longer-range thinking, the business schools begin to experience similar curricular conflicts to those in the traditional social service professions.

JOURNALISM

Historians of journalism education generally agree that the field developed with two divergent philosophies.[39] According to Albert A. Sutton, programs of journalism had followed the views expressed by (Harvard president) Charles W. Eliot and (founding donor to Columbia) Joseph Pulitzer. The 'Eliot plan,' emphasizing practical training, enjoyed early favor for many years, based on support from both educators and newspapermen. "However," Sutton observed in 1945, "the gradual trend toward less stress on technical courses in favor of background instruction in the social sciences points to a growing shift to the Pulitzer point of view."[40]

Several institutions lay claim to 'firsts' in collegiate journalism education, beginning in 1869 with a program of "press scholarships" at Washington College (now Washington and Lee University), which enabled young men to earn their tuition by working in a local printing plant. The University of Pennsylvania offered the first organized curriculum in journalism from 1893 to 1901, and the University of Illinois offered the first four-year program in journalism in 1904. The University of Missouri, which had begun journalism instruction in 1878, opened the first separate school of journalism in 1908.[41] In addition to preparation in English, history, economics, government, finance, philosophy, and psychology, courses were given "by experienced newspapermen" in the history and principles of journalism, reporting, newspaper correspondence, editorial writing, newspaper jurisprudence, illustrative art, newspaper publishing, and circulation. Students at the University of Missouri also gained practical experience in a laboratory environment through the daily publication of the *University Missourian*.[42]

In contrast with the operations-oriented approach characterized by Missouri, Joseph Pulitzer's founding vision for a school of journalism sought to "raise journalism to the rank of a learned profession."

> Not to teach typesetting, not to explain the methods of business management, not to reproduce with trivial variations the course of a commercial college .... The School of Journalism is to be, in my conception, not only not commercial, but anticommercial. It is to exalt principle, knowledge, culture, at the expense of business if need be. It is to set up ideals, to keep the counting-room in its proper place, and to make the soul of the editor the soul of the paper.[43]

According to Horace Coon, conflict between scholars and practitioners plagued the college at Columbia from its very beginning:

> The academically-minded took a top-lofty attitude about anything so practical and superficial as the teaching of journalism .... Hard-boiled old newspapermen spat their contempt at the school and its lily-fingered, culture-imbued graduates.[44]

Similar conflicts pervaded the field as journalism education moved beyond the establishment of technical courses into its second phase. This period emphasized the study of journalism history and of the press as a social institution; instruction began to expand beyond daily and weekly newspapers. According to Michael Emery and Edwin Emery, pioneer textbooks in such areas as journalism history and newspaper ethics, "pointed the way toward integration of technical training with analysis of the social responsibilities of the journalist."[45] Associations and professional journals came into prominance: The American Association of Teachers of Journalism was founded in 1912, and the American Association of Schools and Departments of Journalism in 1917. The first journal devoted to research studies in the field of mass communications, *Journalism Bulletin* (renamed *Journalism Quarterly* in 1930), appeared in 1924.[46]

By the 1930s, a third phase of journalism education was developing. According to Emery and Emery, the goal of this period was fuller integration of journalism education with the social sciences. The leading schools and departments understood research and teaching in the field of communications as a whole. Master's level instruction, and continuing emphasis on research expanded throughout the 1930s. In 1935, the Pulitzer School at Columbia restricted admission to its one-year course to those possessing a bachelor's degree. Northwestern University developed a five-year plan for professional training in 1938.[47] By 1939, however, only one institution, the University of Missouri, granted a doctoral degree in journalism, although journalism could serve as a minor for the Ph.D. at Northwestern, Wisconsin, and Minnesota.[48]

Examining the histories of journalism schools at Illinois, Minnesota, Stanford, and Northwestern, William Lindley found several common themes. First, all institutions exhibited a professional, or practice-oriented emphasis in journalism curricula. Second, all acknowledged the social science roots of communication as a field of study; the social science emphasis predominated at Stanford, and was also strong at Minnesota dating back to 1926. Third, journalism programs that began as branches of English departments also reflected the influence of the humanities, but at all four schools the humanities theme was less important than that of the social sciences. Fourth, an early emphasis on rural journalism, oriented to training country editors, was common in land-grant colleges. Concluding that schools of journalism had assimilated "some of the subject matter of each ... without changing [their] practical orientations," Lindley explained the introduction of quantitative research into the journalism curriculum, and the resulting split between journalism and communications: "From social psychology grew a new approach to the media which journalism could neither completely assimilate nor ignore: Communication emphasis in journalism curricula." He wondered whether communications theorists and journalists might "pull away from each other to form separate schools." Alternatively, the two camps might merge organizationally under the rubric of mass communications and society courses.[49]

Regarding conflicts associated with scholars teaching practitioners, journalism falls conveniently in the middle of the status continuum, between education and business. Journalism schools do share some of the problems experienced by schools of education, such as unclear mission, intellectual ambivalence, and (increasingly) feminization.[50] Robert Blanchard and William Christ observe that mass communications curricula have typically been organized around specific occupations (e.g., advertising, journalism, public relations) or delivery systems (e.g., newspaper, magazine, radio, television), leading to fragmentation and lack of curricular coherence, which in turn contribute to "relatively low status and low intellectual rigor and research productivity

... on most campuses."[51] According to William David Sloan, journalism education suffers from a double inferiority complex, neither measuring up to the standards of the profession nor of academia.[52]

Journalism does not, however, demonstrate conflicts based on status differentials in professional roles to the same extent as education and business. While certain majors, such as advertising and public relations, have increased in popularity at the expense of print journalism sequences,[53] these shifts do not represent a departure from preparation for the central practitioner role. After the initial move away from printing and typesetting at the end of the nineteenth century, journalism education has not shown an increasing tendency toward managerial or administrative functions.[54] Recent evidence does support Lindley's predictions of an increasing emphasis on mass communication as a social institution.[55] In Sloan's view, however, "[a]lthough others recognize the importance of mass communication in today's world, rarely have they turned to journalism educators for explanations. For their part, journalism professors have done little to persuade others of the validity or consequences of their scholarship."[56]

According to Glazer, elevation of the intellectual demands of professional degrees was destined to failure due to the instability of the knowledge base. As already seen for education and business, the changes in essential professional knowledge have been neither as rapid nor as upsetting as Glazer found them to be. Rather than business schools, schools of journalism may well depict an "uncharacteristically secure pattern of training." No scathing reports have inspired reform movements; no "radical revolutions" have occurred in over eighty years, let alone every ten.[57] Contemporary accrediting standards reflect an approach to curriculum and instruction virtually unchanged throughout the first century of journalism education.

CONCLUSION

This examination of the development of schools of education, business, and journalism points to two important implications for historians of higher education. The first pertains to the utility of Glazer's framework as a guide for investigating the schools of the minor professions. Tracing the roots of these schools does confirm the presence of the four sources of conflict over time, although the range of responses to the inevitable tensions in education for the minor professions may not be as limited as Glazer suggests. Historical analysis (and twenty years of relative stability) tend to weaken the validity of the fourth category, conflicts arising from rapid change in accepted professional knowledge and training. Nevertheless, while the shifts in curriculum and instruction have been more gradual than Glazer found them to be, the theme continues to have relevance for the social science based minor professions.

The second implication relates to the minor professions as a sphere for study. Struggles for balance between education and praxis pervade the history of the American university curriculum. Nowhere are the tensions more clearly delineated than in the schools for the minor professions. Schools of business and journalism share, to a greater or lesser extent, the challenges experienced by the schools of education, social work, nursing, divinity, and town planning originally examined by Glazer. One might expect that even the science-based minor professions, such as engineering, also excluded by Glazer, occasionally face similar contests between academic and professional values. A broader understanding of the problems (and opportunities) inherent in education for the minor professions will enable educators to better recognize those that are universal and those that are distinctive to their particular field.

NOTES

[1] An earlier version of this paper was presented to the Association for General and Liberal Studies 1993 Annual Meeting as "Applied Social Science and Education for Public Leadership: The Origins of Business Journalism and Teacher Education in the U.S."

[2] Nathan Glazer, "The Schools of the Minor Professions," *Minerva* 12 (July 1974): 346-364, quotes p. 346.

[3] If Glazer's characterization of law and medicine was accurate at the time he was writing, it may well be less so today. Just as he suggested that divinity, once considered a learned profession, more closely resembled a minor profession in contemporary practice, one might argue that practitioners of law and medicine are gradually relinquishing professional autonomy to corporate employers. On the other hand, some sub-specialities in business, notably certified public accounting, are not ony licensed by the state, but increasingly self-regulated.

[4] According to the National Center for Education Statistics (NCES), *Digest of Educational Statistics* (Washington, D.C.: OERI, 1993), in 1990-91 the bachelor's degree represented 92 percent of all degrees in communications, 76 percent in business/management and 54 percent in education (of which some 96 percent were preparation for classroom practice, including teacher education and special education.)

[5] Glazer, "Schools of the Minor Professions," 357.

[6] *Ibid.*, 358.

[7] *Ibid.*, 359.

[8] *Ibid.*, 363.

[9] Jurgen Herbst, *And Sadly Teach: Teacher Education and Professionalization in American Culture* (Madison, Wisc.: The University of Wisconsin Press, 1989), p. 11.

[10] Geraldine Jonçich Clifford and James W. Guthrie, *Ed School: A Brief for Professional Education* (Chicago: University of Chicago Press, 1988), 69-70. See also, Arthur G. Powell, *The Uncertain Profession: Harvard and the Search for Educational Authority* (Cambridge, Mass.: Harvard University Press, 1980), 69, 108.

[11] Clifford and Guthrie, *Ed School*, 100.

[12] Herbst, *And Sadly Teach*, 8.

[13] Clifford and Guthrie, *Ed School*, 73-74. Lawrence Cremin, David A. Shannon, and Mary Evelyn Townsend, *A History of Teachers College, Columbia University* (New York, N.Y.: Columbia University Press, 1954), 36.

[14] Clifford and Guthrie, *Ed School*, 79, 131-32.

[15] Storr, *Harper's University*, 296-97. In 1901, Dewey's Departments of Education and Philosophy were consolidated, and merged into the newly created School of Education, which administratively housed Chicago's laboratory schools and the teacher-training program. Upon the death of its first director, Francis Parker, in March 1902, Dewey became Director of the School of Education. (p. 302)

[16] Powell, *Uncertain Profession*, 102-107. Contemporary critics, however, felt that research and intellectual standards had been badly compromised by preoccupations with praxis: *cf.* Abraham Flexner, *Universities: American, English, German* (New York, N.Y.: Oxford University Press, 1930), 99.

[17] Clifford and Guthrie, *Ed School*, 221.

[18] *Ibid.*

[19] Powell, *Uncertain Profession*, 37.

[20] Cremin, Shannon, and Townsend, *Teachers College*, 140.

[21] *Ibid.*, 162.

[22] Clifford and Guthrie, *Ed School*, 341.

[23] The Holmes Group, *Tomorrow's Teacher: A Report of the Holmes Group* (East Lansing, Mich.: The Holmes Group, 1986); Task Force on Teaching as a Profession. *A Nation Prepared: Teachers for the 21st Century* (Hyattsville Md.: Carnegie Forum on Education and the Economy, 1986).

[24] Steven R. Mark, *Ohio Colleges and Universities During the Gilded Age: Institutional Evolution, Elective Curriculum, Graduate Education, and Commercial Programs, 1865-1901* (Ph.D. diss., Bowling Green State University, 1991), pp. 430-432.

[25] Storr, *Harper's University*, 137.)

[26] Steven A. Sass, *The Pragmatic Imagination: A History of the Wharton School 1881-1981* (Philadelphia, Pa.: University of Pennsylvania Press, 1981), 156-158.

[27] For complete discussion of the Harvard case method, see Robert M. Smith, *The American Business System and the Theory and Practice of Social Science: The Case of the Harvard Business School, 1925-1945* (New York, N.Y.: Garland Publishing Inc., 1986). For analysis of the influence of the Harvard case method on other business schools, see Steven Schlossman, Michael W. Sedlak, and Harold Wechsler, *The "New Look": The Ford Foundation and the Revolution in Business Education*, GMAC Occasional Papers (Los Angeles, Calif.: Graduate Management Admission Council, December 1987), 20-24; Michael W. Sedlak and Steven Schlossman, "The Case Method and Business Education at Northwestern University, 1906-1971," *Selections: The Magazine of the Graduate Management Admission Council* (Winter 1991): 14-38; Michael W. Sedlak and Harold F. Williamson, *The Evolution of Management Education: A History of the Northwestern University J. L. Kellogg Graduate School of Management 1908-1983* (Urbana and Chicago, Ill.: University of Illinois Press, 1983).

[28] Sass, *Pragmatic Imagination*, 157-58.

[29] *Ibid.*, 175.

[30] Richard H. Landsburgh, *Industrial Management* (New York, N.Y.: John Wiley & Sons, 1923), 2; cited in Sass, *Pragmatic Imagination*, 175.

[31] See Robert A. Gordon and James E. Howell, *Higher Education for Business* (New York, N.Y.: Columbia University Press, 1959) and Frank C. Pierson, *The Education of American Businessmen* (New York, N.Y.: McGraw-Hill, 1959), sponsored by the Ford and Carnegie Foundations respectively. For detailed discussion of the findings of the foundation reports, see Paul S. Hugstad, *The Business School in the 1980s: Liberalism versus Vocationalism* (New York, N.Y.: Praeger, 1983), 13-27. For discussion of historical context for the Ford Foundation studies, see Schlossman, Sedlak and Wechsler, *New Look*, 3-6.

[32] Schlossman, Sedlak, and Wechsler, *New Look*, 85-92, quotes, p. 85, 88. The evolution of Northwestern University's School of Commerce (1908-1953) to School of Business (1953-1965) to Graduate School of Business Administration (1965-1969) to Graduate School of Management described by Sedlak and Williamson, *Evolution*, illustrates a nationwide trend. In Northwestern's case, the final name change also represented a broader orientation that included not only business but public, hospital and health, and education management (p. 122).

[33] E. T. Grether, "The Development of the AACSB Core Curriculum," in *The American Association of Collegiate Schools of Business 1916-1966* (Homewood Ill.: Richard D. Irwin, Inc., 1966), 146-157; Sass, *Pragmatic Imagination*, 322-325.

[34] Grether, "AACSB Core Curriculum," 154-55.

[35] Sass, *Pragmatic Imagination*, 267-68.

[36] Robert R. Locke, *Management and Higher Education Since 1940: The Influence of America and Japan on West Germany, Great Britain and France* (Cambridge, N.Y.: Cambridge University Press, 1989), 42.

[37] *Ibid.*, 363.

[38] See, for example, Lyman W. Porter and Lawrence E. McKibbin, *Management Education and Development: Drift or Thrust into the 21st Century?* (New York, N.Y.: McGraw-Hill, 1988), especially 45-75, 88-110.

[39] De Forest O'Dell, *The History of Journalism Education in the United States*, Contributions to Education no. 653 (New York, N.Y.: Teachers College, Columbia University, 1935), 55-96; Albert A. Sutton, *Education for Journalism in the United States from Its Beginning to 1940*, Northwestern University Studies in the Humanities no. 14 (Evanston, Ill.: Northwestern University, 1945), 14-16; William R. Lindley, *Journalism and Higher Education: The Search for Academic Purpose* (Stillwater, Okla.: Journalistic Services, 1975), 3-6, 48-55; William David Sloan, "In Search of Itself: A History of Journalism Education," in *Makers of the Media Mind: Journalism Educators and Their Ideas* (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1990), 7-11.

[40] Sutton, *Education for Journalism*, 14. The 'Eliot Plan' refers to suggestions on journalism education elicited by Pulitzer in 1903, the importance of which have perhaps been exaggerated in the histories of the field. Sutton's view forms the basis for Michael Emery and Edwin Emery's widely cited three-stage characterization of the history of journalism education, *The Press and America: An Interpretive History of the Mass Media*, 7th ed. (Englewood Cliffs, N.J.: Prentice Hall, 1992), 516-518, but Sloan argues that during the Depression era, "providing professional training, rather than preparing students to improve journalism in order to improve society, became the primary focus of education. Practical skills—reporting, copy editing, typography, writing advertising copy—became the heart of the curriculum" (p. 13).

[41] O'Dell, *History of Journalism*, 5; Sutton, *Education for Journalism*, 7; Lindley, *Journalism and Higher Education*, 1-2; Elizabeth Tarnove, *An Examination of Undergraduate Journalism Education in the United States: Conflict between Academic and Professional Standards* (Ph.D. diss., Claremont Graduate School, 1991), p. 6; Earl English, *Journalism Education at the University of Missouri-Columbia* (Marceline, Mo.: Walsworth Publishing Company, 1988).

[42] English, *Journalism Education at Missouri-Columbia*, 4.

[43] Joseph Pulitzer, "Planning a School of Journalism—The Basic Concept in 1904," in H. Fischer & C. G. Trump, eds., *Education in Journalism: The 75th Anniversary of Joseph Pulitzer's Ideas at Columbia University (1904-1979)* (Bochum, West Germany: Studienverlag Dr. N. Brockmeyer, 1980), 33-35.

[44] Horace Coon, *Columbia: Colossus on the Hudson* (New York, N.Y.: E. P. Dutton, 1947), 244.

[45] Emery and Emery, *The Press and America*, 517. Flexner's tirade against professional education refutes the trend toward professionalization, rating university schools of journalism "on a par with university faculties of cookery and clothing." He quotes a recent graduate of the Columbia School of Journalism who maintained that his studies had included no "critical or constructive evaluations of the professions as such" and charged that an "attempt to deal with newspapers as a social institution with responsibilities and opportunities was frowned on by the instructors" (pp. 160-162).

[46] *Ibid.* See also Gale Workman, *The Accrediting Council on Education in Journalism and Mass Communications: A History 1970-1985* (Ph.D. diss., Florida State University, 1988), 17.

[47] Emery and Emery, *The Press and America*, 518. See also Sutton, *Education for Journalism*, 48-49; Lindley, *Journalism and Higher Education*, *passim*.

[48] Sutton, *Education for Journalism*, 48-49.

[49] Lindley, *Journalism and Higher Education*, 49-55 (quotation, 52).

[50] According to NCES data, in 1990-91 more than 60 percent of bachelor's and master's degrees and about 45 percent of doctoral degrees in communications were awarded to women. By contrast, women received about 79 percent of bachelor's, 78 percent of master's, and 58 percent of doctoral degrees in education; and about 47 percent of bachelor's, 35 percent of master's, and 26 percent of doctoral degrees in business and management. This issue is explored in depth by Maurine H. Beasley and Kathryn T. Theus in *The New Majority: A Look at What the Preponderance of Women in Journalism Education Means to the Schools and to the Professions* (Lanham, Md.: University Press of America, 1988).

[51] Robert O. Blanchard and William G. Christ, *Media Education and the Liberal Arts: A Blueprint for the New Professionalism* (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1993), 40.

[52] Sloan, *Makers of the Media Mind*, 4.

[53] Blanchard and Christ report that in 1975 and 1976 advertising and public relations accounted for slightly less than a quarter of all bachelor's degrees in communication and media study programs; by 1986, 44 percent of all students in mass communications programs were pursuing public relations and advertising degrees.

[54] Media management courses and degree programs do exist, primarily at the master's level, but they are not significant enough to merit a separate classification by NCES. Indeed, the *Digest of Education Statistics* lists only eight sub-specialties under "Communications, total" (of which two are "Communications, general", and "Communications, other"), whereas twenty-five sub-specialties exist under "Business and management, total" and sixty sub-specialties exist under "Education, total."

[55] See, for example, Blanchard and Christ on "The New Liberal Arts," *Media Education*, 3-21 and 53-59.

[56] Sloan, *Makers of the Media Mind*, 5.

[57] See Project on the Future of Journalism and Mass Communication, *Planning for Curricular Change*, 2nd ed. (Eugene, Ore.: School of Journalism, University of Oregon, 1987), generally known as the *Oregon Report*, especially Chapter X (Epilogue), 60-70.

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